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# The Commonwealth of Massachusetts

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FRANCIS W. SARGENT, *Governor*

Executive Office of Manpower Affairs

Mary B. Newman, *Secretary*

DEPARTMENT OF LABOR AND INDUSTRIES

ROCCO ALBERTO, *Commissioner*

DIVISION OF OCCUPATIONAL HYGIENE

HAROLD BAVLEY, P.E., *Director*



## ANNUAL REPORT

# 1974

Originating Office



Department of Labor and Industries, Division of Occupational Hygiene

39 Boylston Street, Boston, Massachusetts 02116



ANNUAL REPORT  
of the  
DIVISION of OCCUPATIONAL HYGIENE  
FISCAL YEAR 1974

This Annual Report records the program and activities of the Division of Occupational Hygiene of the Department of Labor and Industries for the fiscal year beginning July 1, 1973, and ending June 30, 1974.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS and duties."

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the division of occupational hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in co-operation with the department of public health or otherwise, to promote occupational health and safety education.

PERSONNEL

Hervey B. Elkins, Ph.D., Director (Retired)  
Harold Bavley, B. S., P. E., Director  
David H. Wegman, M.D., Occupational Hygiene Physician  
Leonard D. Pagnotto, M. S., Chief of Chemical Services  
Ronald S. Ratney, Ph.D., Chief of Laboratory  
Robert F. Cashins, A. A., Senior Industrial Sanitary Engineer



Thomas Crupi, B. S., Senior Industrial Sanitary Engineer  
Roger P. L'Heureux, B. S., Industrial Radiation Control Supervisor  
Anne C. Ackerman, R. N., Supervising Occupational Hygiene Nurse  
Henry L. Smith, B. S., Senior Chemist  
Max Richmond, B. S., Senior Chemist  
Thomas J. Vegella, B. S., Assistant Chemist  
Bernice Linde, B. S., Head Clerk  
Louise H. Lydon, Senior Library Assistant  
Olga V. Stripinis, Senior Clerk and Stenographer  
Ann Schlosberg, Senior Clerk and Stenographer  
Janice F. Piracini, Junior Clerk and Stenographer  
Judy Barrett, Junior Clerk and Stenographer  
Deverly Angelo, Junior Clerk and Stenographer

Dr. H. B. Elkins retired in October, 1973.

Mr. H. Pavley assumed the duties of Director in October, 1973.

The following provisional promotions became effective as of April 1, 1974:

Mr. L. D. Pagnotto to Chief of Chemical Services.

Dr. R. S. Ratney to Chief of Laboratory

Mr. T. Crupi to Senior Industrial Sanitary Engineer.

Mr. T. Vegella to Assistant Chemist.

Two permanent promotions became effective as of April 1, 1974:

Mr. H. L. Smith to Senior Chemist.

Mr. M. Richmond to Senior Chemist.

Miss. Schlosberg transferred to another State department in April.

Miss Piracini reported in November and left in December.

Miss Angelo reported in February and left in May.

A middle management study resulted in the following upgradings effective July 1, 1973:

Director - Grade 20 to Grade 23  
Occupational Hygiene Physician - Grade 22 to Grade 26  
Chief of Laboratory - Grade 19 to Grade 21  
Senior Engineer - Grade 18 to Grade 19  
Asst. Engineer - Grade 16 to Grade 17

A 6.2% cost-of-living increase became effective December 30.

#### ORGANIZATION AND SERVICES

The Division of Occupational Hygiene in the Department of Labor and Industries is an official advisory agency of the Commonwealth of Massachusetts established by





the Legislature in 1934, to investigate conditions of occupation with reference to hazards to health. The Division assists employers, labor, state and local agencies, and all individuals concerned with the prevention of occupational diseases and the detection, evaluation, control, and prevention of industrial health problems.

The Division is divided administratively into an engineering section, a chemical section including a laboratory, a medical and nursing section, and an information section.

#### General Activities

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston.

A total of 680 services were undertaken and 320 requests, including 34 out-of-state requests for information on matters pertaining to occupational health were answered. These services required a total of 833 plant visits, 232 visits to other agencies, and 59 talks and lectures by the Division staff.

Field studies involved 4027 measurements of environmental conditions and the collection and analysis of 1417 air samples in places of employment. In addition, the laboratory evaluations included the analysis of 2336 urine samples and 8 material and smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U.S. Department of Health, Education and Welfare, and analyzed 112 simulated air samples for asbestos, lead, cadmium, zinc and solvents.

The plant studies and visits resulted in more than 1350 recommendations potentially affecting nearly 43,000 workers. More than 120 follow-up visits revealed the completion of 114 recommendations affecting 5100 workers.

#### STATE 18B PLAN REVISED FOR RESUBMISSION TO OSHA

The Occupational Safety and Health Plan for the Commonwealth of Massachusetts known as the State 18(B) Plan was not accepted by the federal Occupational Safety and Health Administration of the U.S. Department of Labor in its original form although the critique requirements were fulfilled. State legislation to implement the plan was given an adverse report by the legislative committee after a public



hearing. After several internal reviews the plan was revised and updated for resubmission to the federal OSHA. Meanwhile, the Governor of the Commonwealth of Massachusetts submitted to the State Legislature a package of legislation, known as House No. 5815 reaffirming his intention of bringing the industrial safety and occupational health laws of the Commonwealth into conformity with the provisions of the federal Occupational Safety and Health Act of 1970.

The new legislation provides for the inclusion of civil jurisdiction which permits citation and the designating of penalties by the Department of Labor & Industries. This part of the legislation was intended to remove an important difference between the federal act and the state legislation. A public hearing on House No. 5815 was held May 20, 1974. The bill was referred to study without an affirmative report. The legislation will be revised and resubmitted for action.

The Department of Labor and Industries was designated by the Governor as the agency for administering the 18(B) plan throughout the Commonwealth. The Department will have full authority to enforce and administer laws relative to the safety and health of employees in all work places with the exception of Federal employees, federally regulated employer, and domestic worker.

The Plan is developmental and was prepared in two integrated parts. Part 2 was prepared by the present director of the Division of Occupational Hygiene. The Division will have the over-all responsibility for administering those functions directed towards the protection of workers in the Commonwealth from occupational diseases and other occupational health exposures and assuring those workers exposed to potential health hazards that such hazards will be adequately evaluated and controlled so that no worker will suffer deleterious effects.

Administration of the program will involve gradual reorganization and expansion of the Division. Additional specialists, equipment and space will be the initial requirements for implementing the 18 (B) State Plan. The Division will become involved in a training program for its own employees as well as employees of other State and municipal agencies and will in time develop a training program for both public and private employees throughout the Commonwealth.





ENGINEERING SECTION

ASBESTOS EXPOSURE FROM CEILINGS SPRAYED WITH ASBESTOS

The Division investigated asbestos exposure in a newly-constructed high school scheduled to open in the fall. As part of the architectural design, in certain areas steel beams fireproofed with asbestos were left exposed. The beams in the boys' locker room were less than 10 feet from the floor and easily reached by someone standing on a bench. An extremely small number of airborne fibers was found in the areas tested.

It was, nevertheless, recommended that the beams be boxed in since it has been shown with time asbestos fireproofing material dries and becomes flaky.

NIOSH reported that a school in Wyoming was closed recently after ten years because asbestos contamination from its exposed beam ceilings, sprayed during construction with asbestos fireproofing material, was high.

UNION INQUIRY UNCOVERS ASBESTOS HAZARD

A union requested a visit to evaluate asbestos exposure in a large manufacturing plant. Review of four areas by Division personnel suggested several asbestos exposures which were not well controlled or where controls were inappropriate. In addition, work practice rules had apparently been changed to allow unwarranted exposures. The initiative of the union provided for the identification of unnecessary hazards and control recommendations have been submitted. Now the union plans to sponsor pulmonary function tests of exposed workers, the examinations to be performed by this Division.

CARBON MONOXIDE KILLS WORKER

A young man died from carbon monoxide poisoning while working at an ice skating rink. The autopsy showed that the man had approximately 70% COHB in his blood at the time of death.

The victim had left the ice resurfacing machine operating inside a small garage-like storage area. Tests taken indicate that the CO concentration in the storage area built up very rapidly when the vehicle was allowed to idle in the storage area. The victim fell between the vehicle and the storage room wall with his face in close proximity to the exhaust pipe outlet. CO concentrations in excess of

1,000 ppm were found at this location. It would seem apparent that the man was alive when he fell but soon died from inhaling the exhaust gases at the exhaust pipe outlet.

#### FATALITY RESULTS IN ICE SKATING RINK SURVEY

As the result of an investigation of a fatality at an ice resurfacing machine storage area in which carbon monoxide poisoning was the cause of death it was decided that a cross-sectional survey of various ice skating facilities be conducted to determine if a serious problem is present relative to employee exposure to

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With the help of the Division of Industrial Safety Inspectors a list of ice skating rinks throughout the state is being compiled. At the present time two facilities were much better than at the location where the fatality occurred. At one location provisions had been made for venting the exhaust gases outside the building whenever the vehicle was allowed to idle in the storage area. This will most likely be a standard recommendation for all such vehicle storage areas.

#### SPECIAL ASBESTOS SURVEY

At the request of a radiologist associated with a local hospital a visit was made to the home of a woman who has developed a cancer which is usually associated with an exposure to asbestos.

The physician advised that the woman was fearful that insulation in her attic contained asbestos and that fibers would enter the living areas. During the visit air samples were collected in the attic and in the dining room of the home. No asbestos was found. A sample of the insulation was brought to the Division Laboratory for analysis. The insulation was of the rock wool type and did not contain asbestos.





From the information obtained and as a result of the survey findings it is assumed that the reported cancer was not associated with a known exposure to asbestos.

RECIRCULATING AIR PRESENTS DANGER TO EMPLOYEES

The Division's staff engineers visited a company in central Massachusetts which uses a large quantity of asbestos in an uncontrolled manner. This company has had an OSHA industrial local exhaust ventilation system for the plant. The exhaust system is being designed around the concept of filtering the exhausted air and recirculating the supposedly clean air back to the plant. The present exhaust system is inadequate and in addition recirculates the filtered air back into the working environment. This Division has in the past recommended that the exhausted air be discharged directly out-of-doors to eliminate the possibility of asbestos being recirculated into the plant.

The OSHA regional industrial hygienist advised that OSHA would allow air that contained a toxic material such as asbestos to be recirculated, provided that the fiber counts were within acceptable limits.

In the opinion of this Division it would be a very serious mistake and poor industrial hygiene practice to allow recirculation of filtered air that contained a toxic material. The main problem is that the system may work satisfactorily when first installed but as the system gets older and the maintenance becomes slack, as is the sad past history of this particular company, then the filter efficiency may deteriorate. Once this occurs then the probability of asbestos fibers being recirculated back into the room increases.

During the visit to this company air samples were collected on the clean (discharge) side of the exhaust system filters. At the location tested no fibers should be found if the system was operating properly. The test results showed fiber concentrations of approximately 5 and 11 fibers per milliliter of air on the clean side of the filters. This means that the filters are not collecting all the asbestos and the potential hazard to the employees is greatly increased. The threshold limit value is 5 fibers.





### RADIOACTIVE CONTAMINATION IN EMPLOYEES' HOMES

Upon a routine inspection of a firm licensed to perform foundry processing of uranium by a member of the Atomic Energy Commission's Compliance Branch, Beta-Gamma contamination was found on the pavement outside the building. Suspecting that the radioactive contamination might be farther reaching, two teams composed of AEC and (upon their request) personnel from the State Departments of Labor and Industries and of Public Health were assembled to conduct surveys.

These yielded low-level Beta-Gamma radiation on clothing in the homes of some employees. These were ordered to be decontaminated, and to allay fears, a release was made to the news media.

The firm was also ordered to institute stricter controls for the containment of radioactivity. --It is interesting to note that, although uranium is an Alpha-emitter other isotopes in its decay chain produce Beta-Gamma radiation, and that the latter would be missed in a survey if not specifically looked for.

### OFFICIAL AGENCIES PLAN FOR NUCLEAR POWER PLANT EMERGENCIES

Prompted by the AEC's licensing procedure for one of Massachusetts' two nuclear power plants, and upon their invitation, a meeting was held to review the response of State agencies to an emergency arising at that facility.

Aside from the AEC and power company personnel, the following agencies were represented: Massachusetts Department of Labor and Industries, Massachusetts Department of Civil Defense, Massachusetts Department of Public Health, Massachusetts State Police, and United States Environmental Protection Agency.

Several important areas were discussed, notably: responsibility in declaring an emergency, legal basis for actions taken, communications network, and available resources (manpower, equipment, laboratory testing, etc.).

Intended as an information-gathering and exchange meeting, the representative of the AEC was gratified that an emergency plan for a nuclear incident in Massachusetts is supported by individuals who have good working relations with one another.



### CARBON MONOXIDE POISONING

An emergency investigation request was received from a central Massachusetts plating shop. Headaches and dizziness were experienced by several workers in a manufacturing plant because of a defective propane-fired space heater. Carbon monoxide concentration in the immediate vicinity of the heater exceeded 1000 ppm. The Maximum Allowable Concentration is 50 ppm. The problem was traced to poor exhaust of the burner which was corrected.

### TRAGEDY PROMPTS INVESTIGATION

A Division Engineer investigated the circumstances surrounding an explosion at a demolition site of an abandoned fertilizer plant. A process pipe was being cut using an oxy-acetylene torch. During the cutting operation the pipe exploded severely injuring the worker and a passerby.

Upon investigation, it was found that pipe taken from the same area contained large quantities of an unknown solid material. A sample of the material was subjected to chemical analysis in the Division laboratory. It was found that the unknown material contained a substantial amount of ammonia and some nitrates. It is hypothesized that the explosion occurred as the result of the combustion of the materials (ammonium nitrate) found in the pipe.

### ALPACA DUST PRODUCES REAL AND POTENTIAL PROBLEM

An engineer from this Division recently investigated a plant where alpaca fur was being processed.

Alpaca which is received from Peru arrives at the plant where it is opened, scoured, gilled, and combed. The combing operation is performed using unventilated carding machines. Excessive alpaca dust concentrations were found throughout the card room.

The possibility of the fur containing anthrax spores is being investigated. Recommendations for control of the dust problem have been submitted to management.





### INDUSTRIAL SAFETY - OCCUPATIONAL HYGIENE WORKSHOPS

Six members of the technical staff advanced the education of the state safety inspectors in the area of industrial hygiene by presenting a series of seminars on the recognition and control of common industrial health hazards. Topics covered included dusts, noise, heavy metals, solvents, radiation, the principles of industrial ventilation, and industrial nursing. Most of the inspectors (both industrial and construction) attended the sessions which were held at the Assabet Valley Regional Vocational High School in Marlboro.

The seminars were characterized by active discussion and many of the inspectors stated that they learned (or relearned) much that would be useful to them in their day to day inspectional activities. Since the sessions several inspectors have requested additional material for distribution to people in the plants that they visit.

### LASER CONTROL

In Massachusetts, several firms are engaged in laser research and development, and an increasing number of new firms are producing lasers or incorporating them into equipment systems for a variety of industrial applications. The Industrial Radiation Control Supervisor is expanding the Division's laser control program by regular visits to these establishments to assure their compliance with regulations governing the safe operation of lasers.

### DIVISION PARTICIPATES IN TV PROGRAM ON ASBESTOS

The Senior Engineer from this Division participated in the taping of a segment of a television program called "Night Shift" which is shown on Channel 5.

The segment deals with the hazards associated with exposures to asbestos. A question and answer format was used with a montage of still pictures showing asbestos exposures, operations, and controls.



CHEMICAL SECTION

MANUFACTURE OF PLASTIC IGLOOS MAY PRESENT A STYRENE HAZARD

A company in western Massachusetts has joined the growing vacation home industry in the state and is now manufacturing futuristic plastic buildings which look like oversized star-shaped igloos. The plant uses the same techniques as are used in the construction of fiberglass boats. Six tunnel-shaped units are made from fiberglass and urethane foam and are shipped to the construction site for final assembly. Currently production is about one house per day. The work force is largely made up of persons considered as hard-core unemployed, whose exposure to styrene is the interest of the Division. An evaluation of the hazard by atmospheric tests did not reveal a hazard to the workers during the present rate of production.

TEMPORARY VENTILATION CAUSES DERMATITIS

An investigation was recently conducted to determine the cause of an outbreak of dermatitis among women employees engaged in the assembly and soldering of microcircuits. The cause was traced to fans used to provide some comfort during the air-conditioning breakdown. The placement of the fans was such as to cause soldering "fumes" (which ordinarily rise innocuously) to be directed about the workers' face and neck. With the fans placed at the employees' backs, the problem was corrected. However, even with the air-conditioning restored, it was found that the skin of those employees who were affected was now less resistant to lower concentrations of solder "fumes".

AN OVERLOOKED SOURCE OF MERCURY CONTAMINATION

Mercury used in the dental office is oftentimes spilled. The liquid metal disperses in the pile of permanently installed carpeting, where it may volatilize in the air, aided by such actions as walking or vacuuming.

Division chemists conducted a survey of three dental offices while professional cleaners vacuumed the carpeting. Levels in excess of four times the maximum acceptable concentration (MAC is  $0.05 \text{ mg/m}^3$ ) were found in the breathing zone of the workers performing the vacuuming in all three cases.



This source of mercury contamination frequently goes unnoticed, and helps to explain high urinary mercury findings in workers and dentists in some dental offices where air sampling in their work areas indicates no appreciable contamination.

#### POTENTIAL CYANIDE EXPOSURE

At the request of the State Department of Public Health a visit was made to a plant that "recycles" used mattresses.

The process involves stacking the mattresses in a vault-type room 18' x 8' x 8' and fumigating the mattresses, using a 2 lb. briquette containing 42% sodium cyanide added to 2 gallons of muriatic acid. The products of the chemical reaction are two very toxic gases, hydrogen cyanide and cyanogen chloride. Cyanogen chloride is readily hydrolyzed in the atmosphere to hydrogen cyanide. Inhalation of hydrogen cyanide may be fatal. Hydrogen cyanide is a true protoplasmic poison combining in the tissues with the enzymes associated with cellular oxidation and hence renders the oxygen unavailable to the tissues and causes death through asphyxia.

The fumigating operation is performed intermittently and a follow-up visit will be made to evaluate the ventilation of the room by means of a small exhaust which is operated for several hours before the vault doors are opened.

#### METALWORKERS POISONED BY CADMIUM FUMES

The recent occurrence of cadmium poisoning in two women working in a metal-working shop re-emphasizes the important fact that factory managers need to be aware of the poisonous nature of the materials they work with. In the cadmium poisoning case studied by the Division, the two women had been making the cadmium-containing items on an intermittent basis when a large order for them was received. The women then worked on the parts eight hours per day five days a week on a machine without exhaust ventilation, and after two weeks they were hospitalized with symptoms of cadmium poisoning. As a result of this incident, the factory installed local exhaust ventilation and this Division found that the process is now quite safe.





safe.

ODORS CAUSE PLANT EVACUATION

Officials of a plant located in a multi-tenanted building complained to this Division that odors permeating the premises resulted in the evacuation of their plant.

The Division investigators interviewed the affected plant personnel who believed the odors were coming from the basement housing a manufacturer of solvents for cleaning machines. An interview with the basement occupant revealed that he too complained of a disturbing odor other than that produced by his manufacturing operations. Further investigation of the odors led to an outside courtyard and the odor was traced to an adjacent manufacturer of phenolic resins. The combination of odors from the resin plant and those from the cleaning solvents produced in the basement resulted in the original complaint. Necessary odor control was recommended to the two plants to eliminate the cause for complaint.

LEAD HAZARD IN PLANT?

NO! SAYS OSHA

YES! SAYS THIS DIVISION

A resin manufacturing plant, which has been under surveillance by this Division for several years because of a potential lead hazard, was surveyed by OSHA recently. Air samples taken in several working areas by the OSHA industrial hygienist revealed concentrations of lead in air to be within acceptable limits. During the past year and a half this plant has had three lead poisoning cases. A month before the OSHA visit air analyses by this Division revealed excessive lead contamination, and analyses of the workers' blood and urine have shown that the workers are absorbing lead in significant quantities. Apparently the plant was operated in such a way as to minimize lead levels in air during the OSHA inspection but this is not typical of the normal operating conditions.

Since OSHA found the plant in compliance, the federal compliance officer can-



not require changes to reduce the lead exposure. Although the Department of Labor and Industries is preempted by OSHA in the enforcement of the lead hazard standards nevertheless the Division will continue to survey this plant at regular intervals and to submit recommendations to the plant management for the protection of the employees from exposure to the potential lead hazard.

#### NEW SOLVENT A POTENTIAL HAZARD

Dimethylformamide (DMF), a widely used and versatile industrial solvent has been reported to cause abdominal pain and hepatic abnormalities. Two such cases, one in the furniture refinishing industry and another in a coating plant, have occurred in Massachusetts. Our Division has commenced an in-depth study of the use of this solvent by air tests and urine measurements. A correlation between the concentration of DMF urine metabolites and degree of illness is sought.

#### HYPERSENSITIVITY TO ISOCYANATES

The chemical section recently investigated two cases of apparent allergic hypersensitivity to isocyanates. In one case, a woman with no previous history of allergy or asthma suffered an acute asthmatic attack within ten minutes after starting to work about 25 feet from a urethane foam pouring unit. In the second case, a man who does have a history of allergy and asthma reported that he suffers an asthmatic attack whenever he comes into a room where urethane foam is being melted in a flame on a fabric coating machine. The ventilation of the process is good and is performed in a large high-ceiling room.

The concentration of isocyanates in the workroom air was not measured during these asthmatic episodes but the experience of this Division suggests that they are well below the current Maximum Allowable Concentration of .005 parts per million.

These occurrences highlight the fact that isocyanates are extremely hazardous and that there will be workers who are adversely affected even with good exhaust ventilation.





### ACCIDENT CAUSES MALATHION EXPOSURE

Fifteen employees of a merchandise warehouse were accidentally exposed to relatively large amounts of malathion insecticide when a box containing 12 pint bottles of this toxic substance was dropped. Our Division arranged for a clean-up of the spill by qualified decontamination personnel, made recommendations for medical surveillance of the workers involved, and performed air tests after the clean-up to determine the safety of the environment.

### MERCURY EXPOSURE FROM HOME OVEN

An unusual request was received by the Division to make a visit to a private home to investigate the possible hazard produced from a Mercury flame switch that broke in a gas oven.

The switch became defective just prior to Thanksgiving while the homeowner was making repairs on the oven.

The oven was used for at least two months before family members were made aware of the hazards of mercury.

A Division of Occupational Hygiene engineer surveyed the potential exposure and made the necessary measurements for mercury vapor. In the cold oven the vapor concentrations were found to be only .01-.02 mg/m<sup>3</sup>. However, with the oven heated to 400°F, the values reached .20 mg/m<sup>3</sup>. (The maximum allowable concentration in industry is 0.05 mg/cubic meter.).

To decontaminate the oven, a large amount of the mercury was removed by the engineer with a vacuum pump and the rest vaporized by heating the oven with the door open. The ambient room air was monitored to ensure that the air levels being omitted were kept within the safe range.

A urine specimen was also collected from the homeowner and was found to be .04 milligrams of mercury per liter of urine. This level indicates an exposure in the past several months. A repeat urine sample within a month revealed a normal level.



#### DIVISION INVESTIGATES VINYL CHLORIDE CANCER HAZARD

Recently, three cases of angiosarcoma, a rare liver cancer, of which usually only twenty-one cases per year are found in the general population, were reported in a Kentucky plant manufacturing polyvinyl chloride. Since then the incidence of this disease among vinyl chloride workers has risen totten, seven from the Kentucky plant, and three others--one from each of three additional plants.

On becoming cognizant of these cases, a medical and environmental surveillance program was organized by this Division for the four polyvinyl manufacturing plants in Massachusetts. A list of present and former vinyl chloride workers is being compiled. Death records in the cancer registry are being reviewed. Medical monitoring of workers currently exposed to vinyl chloride is proposed. At present environmental sampling for vinyl chloride exposure has been accomplished in all four plants.

#### CHEMICAL SHORTAGE CAUSES REUSE OF TOXIC SOLVENT

The use of 2-nitropropane was discontinued in artificial leather plants several years ago because of its harmful effects on the liver and kidneys. Recently, however, because of the shortage of methyl ethyl ketone, it was introduced into formulations used in a fabric-coating plant without any knowledge of its toxicity. Fortunately, no apparent ill effects have been produced from its use to date. However, staff chemists recommended that a less toxic substitute be found.

#### A POSSIBLE UNSUSPECTED VINYL CHLORIDE EXPOSURE

Vinyl chloride gas has been shown to be carcinogenic. Although significant exposures to this gas have only been reported in the manufacture of polyvinyl chloride, a reaction of the gas to produce a solid product, one wonders about the potential exposure to vinyl chloride gas from the use of the finished product. With this in mind air tests were made in two plants, one where polyvinyl chloride was compounded. and another where it was used in injection molding. Preliminary findings suggest





gest that trace amounts of what could be vinyl chloride gas are given off in the heating process. Further studies are in progress to verify the initial findings.

#### FREON 22 SUSPECTED OF CAUSING HEART TROUBLE

A group of pathology residents at a local hospital who use Freon 22 in their work were all found to have a history of cardiac arrhythmias (heart palpitations). Since the Freons are considered to be among the safest of industrial chemicals and since the pathologists are exposed to a number of other stresses, this Division is initiating a study of other users of Freon. Another group of pathologists, an air-conditioning service organization, an aerosol packaging plant and a manufacturer of foamed plastics will be visited to assess worker exposure to Freons and to take medical histories.

This program will involve extensive cooperation between this Division and personnel at the Harvard Medical School, the Harvard School of Public Health and Boston City Hospital.

#### CITY EMPLOYEES OVERCOME BY SOLVENT VAPORS

An emergency request for an investigation was received from a nearby municipality after three employees out of a nine man workcrew had been made ill while constructing fiberglass boats to be used for a city sponsored sailing program.

Air tests for styrene vapors in the workroom atmosphere revealed concentrations that averaged between 300 to 400 parts per million and peak concentrations as high as 900 parts per million.

Recommendations to control this hazard were presented.

#### SUSPECTED CANCER CAUSING AGENT STILL IN USE

This Division surveyed a plant where methylene-bis-o-chloroaniline (MOCA) is being used. This substance is known to cause cancer in rats but no cases of human cancer attributable to it have been reported. The housekeeping and work practices





: in the plant are very poor and this Division is instituting an intensive follow-up program in an effort to protect the employees from the risk of contracting cancer.

#### AN UNUSUAL MERCURY EXPOSURE INCIDENT

Droplets of mercury were detected in the corner of a cellar room by the new owner of a family house. This finding led him to request an environmental survey by the Department of Public Health which revealed mercury concentrations in excess of  $0.1 \text{ mg/m}^3$  (twice the industrial limit) in the cellar room and  $0.04 \text{ mg/m}^3$  elsewhere in the living quarters of the house. Biological monitoring by the Division of Occupational Hygiene revealed that the two occupants of the house showed urinary mercury levels in excess of  $0.15 \text{ mg/L}$  (the biological threshold limit for industrial workers). It was learned later, that the former owner was a scientist who used mercury in his work.

Five pounds of mercury were recovered in the space under the wood floor of the cellar, which had to be completely removed. Since the clean-up, mercury excretion of the two occupants has shown a steady, but slow decrease.

#### CAN FIBROUS GLASS CAUSE LUNG DISEASE?

A staff member of this Division attended recent 2-day symposium on the hazards to workers caused by fibrous glass. Sponsored by the National Institute for Occupational Safety and Health, this meeting brought together 138 persons from industry, universities and government to discuss fibrous glass, which is a widely used substitute for asbestos(a known carcinogen).

The main areas of discussion were methods of production, techniques of air analysis, experiments on animals and health screening studies of exposed workers. No general statement was produced by the conference but the main conclusions were:

- 1.) Glass fibers less than 0.5 microns in diameter and more than 10 microns in length cause cancer and lung stiffening in experimental animals.



- 2.) Workers in industry are generally exposed to less than 0.2 fibers per ml of air, which is one tenth the accepted safe limit for asbestos.
- 3.) No illnesses of the lungs or other parts of the body which would be caused by fibrous glass have been observed in persons who have worked for as much as forty years with the material.

OSHA HEARINGS  
ON THE VINYL CHLORIDE  
STANDARD

The Chief of Laboratory attended one day of hearings (June 25th) on a proposal to lower the standard for vinyl chloride from 50 to 1 ppm. There appears to be no doubt that vinyl chloride is carcinogenic to animals and 19 cases of liver cancer (angioscarcoma) have been reported thus far in men employed in the manufacture of polyvinyl chloride. A compromise standard is sought which would allow industry to continue manufacturing polyvinyl chloride and still provide adequate protection to workers. The hearings which were originally scheduled only for June 25-29th, because of the large volume of testimony available, will resume on July 8th.

ADMINISTRATIVE ACTIVITIES

THE ENVIRONMENTAL IMPACT PROBLEM--A JOINT RESPONSIBILITY

The Division Director, physician, and two staff engineers attended a meeting in Director Grady's office to discuss environmental impact reports for industrial safety and occupational hygiene activities. Discussion was centered around the various circumstances relating to inspections and surveys in which an environmental problem may arise; procedures which our inspectors should follow in these circumstances; a review of existing regulations of the Department of Public Health which should be relied on in each instance; and inter-agency staff relations which should be followed to assure coordination and compliance.

OSHA HOLDS WORKSHOP ON COST SHARING

The principal planner and the chief of laboratory who are directly concerned





with requesting federal grants attended a two-day workshop sponsored by the Occupational Safety and Health Administration, U. S. Dept of Labor, on "Principles for Determining Cost Applicable to Grants and Contracts with State and Local Governments."

Representatives of the federal and state governments discussed the process and purpose of cost determination of grant programs, illustrating methods of determining indirect and direct costs for inclusion in grant proposals utilizing case studies developed for this workshop.

Each grant or contract must be negotiated annually. The speakers' consensus as to the best type of contract for State grants was the fixed rate contract with roll forward award.

#### OSHA PLANNING GRANT EXTENDED

The Division's OSHA Planning Grant was extended to December 31, 1973 to permit implementation of the plan when approved, review of the plan, discussion of the plan's adequacy, interpretation of the plan for labor, management and government officials, and to continue liaison with the Division of Industrial Safety during this extension for review of the entire State 18b plan.

#### NEW ENGLAND ENVIRONMENTAL HEALTH SOCIETIES MEETING

Several staff members attended a special all day meeting of the three New England Environmental Health Societies which had as their theme the standard setting process, the data base for criteria development, and the consequences of environmental standards. Well known experts in the fields of industrial hygiene, radiation and air pollution discussed pertinent problems and their solutions.

#### DOH TO PARTICIPATE IN THE NATIONAL SURVEILLANCE NETWORK

Representatives of the National Institute of Safety and Health from the Cincinnati Headquarters and the Region I Director of NIOSH together with the Director of Occupational Health of Rhode Island and his staff met with the Division staff



to discuss participation in the National Surveillance Network for Occupational Health sponsored for NIOSH.

The survey form would be completed and forwarded to NIOSH for storage. The information will be retrievable in tape form for use in the Massachusetts management information system when that system becomes operational.

#### SPECIAL SEMINAR ON NUCLEAR MEDICINE

The DOH Industrial Radiation Control Supervisor attended a seminar conducted jointly by the New England Health Physics Society and the New England Chapter, Technologist Section of the Society of Nuclear Medicine which was held at the New England Memorial Hospital in Stoneham. Entitled "Practical Health Physics Problems in Nuclear Medicine Departments," the seminar brought together health physicists, whose interest is the protection of individuals from the hazards of radiation, and nuclear medicine technologists, many of whom are students, who are or soon will be directly involved with the diagnostic or therapeutic use of radioactive materials in hospitals.

Experts from various organizations; namely, Harvard University's Health Services, Federal Drug Administration's Bureau of Radiological Health, Peter Bent Brigham Hospital's Joint Program in Nuclear Medicine and New England Deaconess Hospital's Division of Nuclear Medicine spoke on such diverse practical subjects as: Surveys, Wastes, Dosimetry, Emergency Procedures, Contamination, Handling and Shielding of Radiopharmaceuticals, "No-No's", and even Paperwork!

There was a large attendance. The seminar assuredly was helpful to the technologist in the nuclear medicine field and to the radiation protection specialist who must concern himself with safety and health in the fast-growing nuclear medicine discipline.

#### FATALITY PROMPTS FIRST AID TRAINING

Arrangements were made by the division nurse with the American Red Cross to provide a course of instructions in first aid to all state agencies located at



39 Boylston Street, Boston, after the occurrence of an incident in one of these agencies which involved a visiting consultant who collapsed during a heart attack and subsequently was "dead on arrival" at a local hospital. The Division Director and a chemist attended the course, "The Red Cross Standard First Aid and Personal Safety Course", which is designed to prepare people by providing them with the knowledge and skills to meet the needs of most situations when emergency first aid care is required and medical assistance is not excessively delayed.

#### AMERICAN INDUSTRIAL HYGIENE CONFERENCE

The Director, the Occupational Hygiene Physician, and the Chief of Laboratory attended the annual American Industrial Hygiene Conference. Technical papers were presented by our Occupational Hygiene Physician and Chief of Laboratory based on the research work being conducted by this Division. The conference brought together outstanding authorities from the United States and from several foreign countries for the interchange of ideas and the presentation of research and field studies in the various disciplines of industrial hygiene. A special evening meeting, attended by an overflow crowd, was devoted to the present problems involving vinyl chloride, a newly discovered carcinogen, presently being used in Massachusetts industry.

#### OSHA TRAINING COURSE

The National Safety Council on contract with the Occupational Safety and Health Administration, U.S. Department of Labor, sponsored a one day training session, "No. 1-Orientation to OSH Act." The course was conducted by the Massachusetts Safety Council at the Old Soldiers Home, Chelsea. Four of the division staff in company with several Division of Industrial Safety Inspectors attended this orientation course which covered the OSH Act passed in 1970, implementation of the Act, Inspection and Standards. The course was considered to be instructive and informative.





MEDICAL AND NURSING SECTION

MASS HYSTERICAL HYPERVENTILATION SYNDROME

As a result of reviewing Industrial Accident Board records this Division became aware of an instance where 20 female migrant farm workers "passed out" outside a department store of a mall where they had spent the evening shopping. Although the event occurred six hours after work and followed one meal, it was thought important to determine whether this was work related.

The victims were taken to two area hospitals. The Division physician and an engineer visited the Emergency Room of one of the hospitals to review the hospital records and meet with the attending physician. Representatives of the employer were also interviewed. As a result of the investigation it was felt that this was a case where one girl fainted for unknown reason and the rest followed with mass hysterical hyperventilation syndrome. Work experience or exposures were determined to be unrelated.

HOSPITAL OFFICIALS RECEPTIVE TO OCCUPATIONAL MEDICINE

Contact was made with the medical and administrative staffs of the Middlesex County Hospital. This hospital is in the process of changing from a tuberculosis sanatorium to a hospital serving all of Middlesex County. The purpose and scope of its service is still in the discussion stage. For this reason the Division Physician spoke with the staff about the potential for establishing an occupational preventive medicine unit with plans to take specific advantage of the pulmonary disease expertise already present. The plan would include a systematic approach to all industry in Middlesex County. The idea was received positively and further discussions are planned to consider specifics regarding services and funding potential.



#### HEAT EXHAUSTION DEATH INVESTIGATED

Investigation of a death due to heat exhaustion was undertaken by the Division physician at a western Massachusetts firm. The exposure area was found borderline excessive by Effective Temperature and markedly excessive by Wet Bulb Globe Temperature. Of particular concern however, was that the employee was admitted to the hospital with a temperature over 106°F and no medical attention was directed to this finding during the period before his death. The emphasis on a possible heart attack with the lack of treatment for hyperthermia prevented action which may have been life saving.

#### STUDY TO RELATE OAT-CELL CARCINOMA AND BIS-CHLOROMETHYL ETHER

Investigation of Oat Cell Carcinoma cases through the Cancer Registry has been undertaken by the Division's medical section with the help of a Harvard college student. Oat cell cancer is potentially associated with exposure to bis-chloromethyl ether and the purpose of the study is to look for occupations where such exposure is not known. The occupations of cases studied and a control population suggested an excess of Oat Cell cases in unskilled laborers. Follow-up interviews for smoking history and job history of cases and controls on their relatives is now being undertaken.

#### COMPENSATION RECORDS VALUABLE SOURCE OF DATA

Evaluation of deaths due to occupational illness is difficult. One way is to review deaths for which compensation is awarded. A review of the reports of deaths possibly related to occupation has been undertaken by the Division. One hundred and forty deaths were reported as occupationally related in the past 10 years. These cases are currently being reviewed to confirm association with employment and cause of death.

#### MEDICAL-NURSING ACTIVITIES

A panel workshop was given at Boston University School of Medicine in coopera-





tion with the Division of Occupational Hygiene, to determine the continuing educational needs of the occupational health nurses in the Commonwealth. There were 93 nurses present. The program was taped and conclusions will be established by the Advisory Panel when the tapes are transcribed. Preliminary evaluation of the workshop suggests that there is an interest and need among Massachusetts Occupational Health Nurses for refresher training and the development of new public health skills.

A lecture was given to Nursing Supervisors and management Peter Bent Brigham Hospital. The lecture was given to familiarize hospital personnel with the various problems (health related) that employees may be exposed to. This was well attended--56 people were present.

A certified course for Occupational Health Nurses was co-sponsored with the Division and the Boston Guild for Hard of Hearing. Lectures and supervising the course was included in the duties. The course was attended by 24 Occupational Health nurses. Future courses will be given--this was oversubscribed.

A meeting was held at Dean Junior College with the Director, Dean of Continuing Education and the Coordinator. It is anticipated that courses will be made available to the Occupational Health nurses in the Taunton, Brockton et al area by February. These will be evening courses with certification.

Winchendon Hospital was visited to introduce to management the value of doing pre-employment physical examinations and special health monitoring procedures for the various industries in the community.

#### STUDENT NURSES AIDED BY DIVISION

The Supervising Occupational Hygiene Nurse arranged for the placement of 37 student nurses to observe occupational health medical programs in various industries in the Commonwealth.

The program was developed for the senior student nurses at Mr. Auburn Hospital, Cambridge.



### PILOT COURSE ON OCCUPATIONAL HEALTH AND SAFETY

The pilot program for continuing education of occupational health nurses has been announced by Middlesex Community College. This evening course has been arranged through the efforts of the Division of Occupational Hygiene staff and the educators of the college. There will be three (3) college credits given on completion. It is anticipated and hoped that this program will be made available to all of the Massachusetts Community Colleges and to any other school of higher education who shows interest. The course is based on the recommendations outlined by the U. S. Department of Health, Education and Welfare "Development of Associate and Baccalaureate Degree Programs for Occupational Safety and Health."

### STUDENT NURSES TO STUDY OCCUPATIONAL HEALTH

A meeting was held with the nurse program coordinator at Lowell State College. One week of study in occupational health, with field visits, will be included in the 1974 senior students' curriculum.

### DIVISION'S HEALTH EDUCATION PROGRAM IN ACTION

An example of how the Division's health education and consultative programs help protect the workers in the Commonwealth involves a safety engineer's request for educational material published by the Division and advice in instituting a program which will help the workers in his plants in recognizing hazardous or toxic materials to which they may be exposed. The Division will supply this Massachusetts based company with copies of our Recommended Safe Practice Bulletins for posting in those plant areas where hazardous and toxic materials are used, handled or stored.

### EDUCATIONAL ACTIVITIES

The Supervising Occupational Hygiene Nurse has enrolled in the 256 hour Adult Practitioner Course at Peter Bent Brigham Hospital.

The Occupational Hygiene Physician participated in a general course of study



for representatives of a variety of eastern Massachusetts unions presented at the University of Massachusetts Institute of Labor Affairs. The lectures given by our physician involved systematic approach solutions to accident investigation and prevention.

#### DEPARTMENT STORES DEVELOP HEALTH POLICY

Assistance was given to a large department store to develop corporative policy for their eleven other stores in various locations, including Massachusetts, New Hampshire and Rhode Island, for first aid procedure, medical surveillance and complete record procedure. This was for industrial and liability injuries to employees and customers..

#### OCCUPATIONAL HEALTH NURSE CENSUS

The annual census for the U.S. Department of H.E.W. regarding the number of occupational health nurses employed in the Commonwealth was completed. There are 582 full-time licensed nurses and 66 part-time licensed nurses currently employed. There are 656 industrial medical units in the Commonwealth.

#### RESEARCH GRANT ACTIVITIES

Several research studies were completed or furthered during the July 1, 1973-June 30, 1974 period, the final year, on the DHEW Grant, "Factors Affecting the Excretion of Industrial Poisons". Published were papers entitled: "The Effects of Methylene Chloride Exposure on Carboxyhemoglobin of Workers"; "Concentration Adjustments in Urinalysis"; and "Mercury and Hazards of Vacuum Cleaning".

Also, during this period a medical follow-up was made on workers who for several years, up to 1965, were exposed to benzene. It was concluded that an average benzene exposure in the range of 40-60 ppm for a prolonged period of time was capable of producing definite blood dyscrasia, at least in some individuals.

Next, a study of ketone excretion was started on workers exposed to methyl





ethyl ketone. Preliminary results indicate that methyl ethyl ketone is not metabolized to any great extent by the human body, and is rapidly excreted in the urine unchanged. Most of the solvent is eliminated through the lungs. Methyl ethyl ketone excretion in urine which reaches a maximum after a few hours of exposure, and returns to normal overnight, appears to correlate well with exposure. Urinary levels of 10-15 mg per liter in urine collected at the end of the work-day appears to correspond to an exposure of about 100 ppm of methyl ethyl ketone. The study is still in progress, but a preliminary report was given at the Miami meeting of the A.I.H.A. in May, 1974.

Preliminary studies were also made on the exposure of workers to N-dimethylformamide, a solvent currently used in large amounts for urethane coatings. Workers exposed to this solvent were found to excrete N-methylformamide, and it correlated with abnormal liver function tests (SGT). Further study on this substance will follow if our request for research funds from DHEW is approved.

Finally, our Division has undertaken an on-going study of workers exposed to chloroform. The plant involved is a one of a kind, a polycarbonate and mylar film manufacturer in Massachusetts, and uses chloroform on a relatively large scale, unusual for this solvent. Chloroform exposure fluctuates considerably, but it seems to average about 35 ppm. There appears to be a significant number of laboratory test results, particularly for blood bilirubin and BUN, in the upper normal range, but no evidence of a progressive increase is indicated. It is concluded that the workers in this plant bear watching. Air monitoring is being performed at least once a year by our Division and on a monthly basis by the plant. Blood and urine tests are performed twice yearly.



SOURCES OF INQUIRY

<u>Source</u>	<u>Services</u>	<u>Information</u>	<u>Total*</u>
Division of Industrial Safety	162	2	164
Follow-up	123	---	123
Radiation surveys	101	---	101
Self-Initiated	92	---	92
Employer	75	90	165
Labor Union-Worker	43	48	91
Government, N.O.C.	38	43	81
Physicians-Hospitals	19	17	36
Consultants-Contractors	---	25	25
Education-Research	---	18	18
Suppliers	---	5	5
Professional Organization	7	11	18
Insurance	3	19	22
Publisher	---	8	8
Non-Official Agency	2	---	2
Attorneys	---	4	4
OSHA	---	2	2
Nurse	2	7	9
Trade Associations	---	3	3
N.O.C.(Tenants,etc.)	9	18	27
Industrial Accident Board	4	---	4
	<hr/> 680	<hr/> 320	<hr/> 1000

\*Includes:

Out of State Requests	34	34
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INVESTIGATIONS OF POTENTIAL HAZARDS

HARMFUL SUBSTANCES AND CONDITIONS

Ventilation Problems	108	Beryllium	9
Noise	61	Naphtha	9
Radioactivity	56	Perchloroethylene	9
Lead	53	Granite	8
Asbestos	44	Smoke, N.O.C.	8
X Radiation	41	Temperature	8
Carbon Monoxide	37	Cadmium	7
Methyl Ethyl Ketone	35	Sulfuric Acid	7
Toluene Diisocyanate (TDI)	34	Styrene	7
Silica	33	Chlorine	5
Toluene	33	Chloroform	5
Organic Solvents, N.O.C.	29	Dermatitis	5
Dimethylforamide	24	Hydrogen Sulfide	5
Mineral Dust, N.O.C.	23	Methylene Chloride	5
Vinyl Chloride	22	1,1,1, Trichlorethane	5
Mercury	19	Acetone	4
Trichloroethylene	16	Freon 12	4
Benzene	14	Tetra Hydrofuran	4
Illumination	14	Ammonia	3
Zinc	13	Acetic Acid	3
Talc	11	Cyanide	3
Nitrogen Dioxide	11	Ether	3
Odors	10	Methyl Isobutyl Ketone	3
Xylene	10	Mica	3
Welding Fume	10	Microwaves	3



Ozone	3	Disyston	1
Polyvinyl Chloride	3	Emery	1
Asphalt Fume	2	Ethyl Acrylate	1
Chromic Acid	2	Ethyl Cellosolve	1
Ethylene Diamine	2	Ethylene Dichloride	1
Foundry Dust	2	Fibrous Glass	1
Fumes, N.O.C.	2	Freon 22	1
Hydrochloric Acid	2	Glass Dust	1
Insecticides	2	Hexachlorophene	1
Lasers	2	Hexane	1
Methane	2	Hydrogen Cyanide	1
Monomethylamine	2	Isopropyl Acetate	1
Nickel	2	Isopropyl Alcohol	1
2-Nitropropane	2	Methanol	1
Other Hazards, N.O.C.	2	Malathion	1
Oxygen	2	MDI	1
Phosphoric Acid	2	Methanol	1
Sulfur Monochloride	2	Methyl Cellosolve	1
Aldehydes	1	Methyl 2-Cyanoacrylate	1
Alpaca Dust	1	MM Furines	1
Aluminum Oxide	1	Monomethyl Formamide	1
N. Butanol	1	Nitriles	1
Butyl Cellosolve	1	Nitrobenzene	1
Combustible Gases, N.O.C.	1	Oil Mist	1
Cotton Dust	1	Ozone	1
Cyclohexone	1	Phenol Formaldehyde	1
Dimethyl Aniline	1	Polyurethane Dust	1
MOCA	2		



Propyl Acetate	1
Selenium	1
Sodium Chlorophenate	1
Talc	1
Titanium Dioxide	1
Trimethylamine	1
Vinyl Acetate	1
Wood Dust	1

CLASSIFIED BY ACTIVITIES

Nursing Consultations	78
Plant - 49	
Others 43	
Medical Activities	18
Committee	4
Requests for reprints	30
Safe Practice Bulletins (Sets)	45





INVESTIGATIONS OF POTENTIAL HAZARDS

SUMMARY BREAKDOWN

<u>Classification</u>	<u>Different Types</u>	<u>Investigations</u>
<u>Chemicals</u>	(54)	(272)
Solvents	28	54
Metals	6	95
Gases	14	106
Others		
Acids	4	13
Fumes	2	4
<u>DUSTS</u>	17	(139)
<u>Physical Hazards</u>		(293)
Noise		61
Radiation		
Radioactivity		56
Xradiation		41
Lasers		2
Microwaves		3
Illumination		14
Temperature		8
Ventilation		108
<u>Infections and Diseases, N.O.C.</u>		(9)
Dermatitis		5
Heart		4
<u>Pulmonary Function Tests</u>		(2)
	TOTAL Investigations	715



FIELD WORK

	<u>Plant Visits</u>	<u>Other Visits</u>	<u>Total</u>	<u>Talks</u>
Director		16	16	1
Engineers	438	33	471	11
Physician	16	47	63	13
Nurse	50	94	144	14
Chemists	<u>328</u>	<u>58</u>	<u>386</u>	<u>20</u>
TOTAL	832	248	1080	59

RECOMMENDATIONS MADE

Environmental	1020	Workers affected	8,877
Health Services	<u>332</u>	Workers affected	<u>33,655</u>
TOTAL	1,352		42,532

RECOMMENDATIONS COMPLETED

Environmental	88	Workers affected	1,493
Health services	<u>26</u>	Workers affected	<u>3,560</u>
TOTAL	114		5,053





ENVIRONMENTAL TESTS

<u>Substance or Condition</u>	<u>Number</u>	<u>In Harmful Exposure Range</u>
Radiation		
Alpha-beta-gamma	400	10
X-rays	361	4
Microwaves	32	0
Heat and humidity	59	50
Illumination	160	58
Noise	1107	640
Chemicals		
Carbon monoxide	242	73
Chlorine	10	0
Ether	30	0
Freon 22	18	0
Hexane	8	1
Mercury	178	54
Methane	6	0
Methyl ethyl ketone	5	0
Organic vapors	100	13
Toluene	10	10
Toluene-benzene mixture	20	15
Ventilation	<u>1281</u>	389
TOTAL	4027	1317



AIR SAMPLES COLLECTED1. Dusts

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Alpaca	3	3
Aluminum oxide	5	3
Asbestos	132	29
Cotton	2	0
Dust, N.O.C.	5	5
Emery	4	0
Fibrous glass	1	0
Foundry dust	20	16
Free Silica	74	53
Glass	1	0
Inert dust	2	1
Mica	6	4
Polyvinyl chloride	4	1
Polyurethane	2	0
Rock (stone)	21	11
Talc	<u>19</u>	<u>3</u>
TOTAL	301	129



AIR SAMPLES COLLECTED  
2: Chemical

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Acetic acid	7	1
Acetone	7	0
Acid mist	2	2
Ammonia	6	0
Asphalt fume	2	2
Benzene	26	3
Beryllium	10	1
N-Butanol	2	0
Butyl acetate	2	1
Butyl Cellosolve	2	0
Cadmium	26	0
Cellosolve	3	0
Chromic acid	1	0
Chloroform	5	0
Combustible gases	4	0
Cyanide	3	0
Cyclohexane	4	0
Dimethylaniline	3	0
Dimethylformamide	72	9
Disyston	1	1
Ether	1	0
Ethyl Cellosolve	3	0
Ethylenediamine	1	1
Freon 12	1	0
Freon 22	5	0





AIR SAMPLES COLLECTED  
2 Chemical (cont'd)

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Hydrochloric acid	2	0
Hydrogen sulfide	9	2
Hexane	8	0
Isopropyl acetate	3	0
Isopropyl alcohol	2	0
Lead	62	23
Malathion	4	0
Mercury	2	0
Methanol	5	2
Methylene - Bis(4-phenyl- isocyanate (MDI)	2	0
Methylene chloride	3	0
Methyl ethyl ketone	120	8
Methyl cellosolve	5	0
Methyl chloroform	9	1
Methyl-2-cyanoacrylate	2	0
Methyl isobutyl ketone	2	0
Monomethylamine	5	0
Naphtha	12	0
Nickel	9	0
Nitrogen dioxide	23	0
2-Nitropropane	6	0
Oil mist and smoke	8	1
Ozone	17	3
Pentoxone	3	1
Perchloroethylene	15	2



AIR SAMPLES COLLECTED  
2. Chemical (cont'd)

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Phenol	1	0
Phosphoric acid	1	0
Polyurethane	2	0
Propyl acetate	3	0
Rubber solvent	1	0
Selenium	1	0
Smoke	2	0
Styrene monomer	13	1
Sulfuric acid	1	0
Sulfur monochloride	4	2
Tetrahydrofurane	24	0
Titanium dioxide	6	4
Trichloroethylene	25	1
Total fume	1	0
Toluene	99	4
Toluene diisocyanate (TDI)	152	21
Vinyl chloride	189	1
Welding fumes	13	8
Xylene	19	0
Zinc	<u>25</u>	<u>7</u>
TOTAL	1116	113



LABORATORY WORK

Air Samples		1417
Chemical	1116	
Dust	301	
Material Samples		25
Chemical	23	
Microscopic	2	
X-ray diffraction	0	
Smear Samples		
Chemical	8	8
Urine Samples		2336
Acetone	56	
Amides	3	
Cadmium	5	
Coproporphyrin	19	
Creatinine	34	
Dimethylformamide	14	
Fluoride	1	
Formamide	2	
Hippuric Acid	92	
Ketone	13	
Mercury	596	
Methyl ethyl ketone	64	
Monomethylformamide	32	
Lead	1249	
Phenol	46	
Trichloroacetic acid	102	





Zinc	9	
Blood Samples		7
Freon 22	7	
Proficiency Analytical Testing Program		112
Asbestos	40	
Lead	40	
Cadmium	8	
Zinc	12	
Solvents	12	
TOTAL		3905



PUBLICATIONS

1. Recommended Safe Practices, Ventilation Data Sheet No. 7,  
"Blasting Rooms". Bulletin, July 1973. 1 p.
2. Recommended Safe Practices, Ventilation Data Sheet No. 10,  
"Foundry Shakeout". Bulletin, July 1973. 1 p.
3. Recommended Safe Practices, Physical Data Sheet, No. 5,  
"Noise". Bulletin, July 1973. 2 p.
4. Recommended Safe Practices, Physical Data Sheet, No. 7,  
"Increased Pressure". Bulletin, July 1973. 2 p.
5. Recommended Safe Practices, Infection Data Sheets No. 7,  
"Tetanus-Lockjaw". Bulletin, July 1973. 2 p.
6. Recommended Safe Practices, Physical Data Sheet No. 14,  
"Tritium". Bulletin, September 1973. 1 p.
7. Recommended Safe Practices, Physical Data Sheet No. 19,  
"Leak Testing of Sealed Radioactive Sources". Bulletin, September 1973. 2 p.
8. Recommended Safe Practices, Chemical Data Sheet No. 30,  
"Uranium". Bulletin, October 1973. 2 p.
9. Recommended Safe Practices, Physical Data Sheet No. 9,  
"Infra-red Radiation". Bulletin, October 1973. 1 p.
10. Recommended Safe Practices, Chemical Data Sheet No. 3,  
"Benzene". Bulletin, November 1973. 1 p.
11. Recommended Safe Practices, Chemical Data Sheet No. 33,  
"Isocyanates". Bulletin, February 1974. 2 p.
12. Recommended Safe Practices, Chemical Data Sheet No. 27,  
"Perchloroethylene". Bulletin, February 1974. 2 p.
13. Recommended Safe Practices, Chemical Data Sheet No. 26,  
"Toluene". Bulletin, February 1974. 1 p.



PUBLICATIONS  
(cont'd)

14. Recommended Safe Practices, Chemical Data Sheet No. 6,  
"Carbon Monoxide." Bulletin, April 1974. 2 p.
15. "In Vivo Conversion of Methylene Chloride to Carbon Monoxide." AMA  
Arch. Environ. Health, April 1974. 4 p.
16. Recommended Safe Practices, Physical Data Sheet, No. 20,  
"Microwaves." Bulletin, April 1974. 2 p.
17. "Vinyl Chloride Investigation." Bulletin, May 1974. 1 p.
18. Recommended Safe Practices, Chemical Data Sheet No. 14,  
"Lead." Bulletin, May 1974. 3 p.
19. "Recommended Safe Practices Bulletins Currently Available for  
Distribution." Bulletin, March 1974. 2 p.









AS: MA13.1-176

# The Commonwealth of Massachusetts

MICHAEL S. DUKAKIS, Governor

Executive Office of Manpower Affairs

Howard N. Smith, Secretary

DEPARTMENT OF LABOR AND INDUSTRIES

NICHOLAS ROUSSOS, Commissioner

DIVISION OF OCCUPATIONAL HYGIENE

HAROLD BAVLEY, P.E., Director

PREVENTION

DETECTION

EVALUATION



CONTROL

## ANNUAL REPORT 1976

Originating Office

Department of Labor and Industries, Division of Occupational Hygiene

39 Boviston Street, Boston, Massachusetts 02116



ANNUAL REPORT  
OF THE  
DIVISION OF OCCUPATIONAL HYGIENE  
FISCAL YEAR 1976

This Annual Report records the program and activities of the Division of Occupational Hygiene of the Department of Labor and Industries for the fiscal year beginning July 1, 1975, and ending June 30, 1976.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentenary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES.

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Harold Davley, D. S., P. E., Director  
David H. Wegman, M. D., Occupational Hygiene Physician  
Leonard D. Pagnotto, M. S., Chief of Chemical Services  
Frederick L. Schultz, Chief of Laboratory  
Robert F. Cashins, A. A., Senior Industrial Sanitary Engineer  
Thomas Crupi, B. S., Senior Industrial Sanitary Engineer





Roger P. L'Heureux, B. S., Industrial Radiation Control Supervisor  
Jack Yee, B. S., Asst. Industrial Hygiene Engineer  
Max Richmond, B. S., Senior Chemist  
Henry L. Smith, B. S., Senior Chemist  
Anne Ackerman, R. N., Supervising Occupational Hygiene Nurse  
Thomas Vegella, B. S., Assistant Chemist  
Erwin Allen, B. S., Junior Chemist  
Bernice Linde, B. S., Head Clerk  
Louise M. Lydon, Senior Library Assistant  
Olga V. Stripinis, Senior Clerk and Stenographer  
A. Rae Yudis, Senior Clerk and Stenographer  
Mary S. Chin-Lin, Senior Clerk and Typist  
Shirley Delano, Senior Clerk and Typist

The following personnel changes occurred during Fiscal 1976:

Shirley Delano was transferred from the Board of Conciliation and Arbitration to this Division as Senior Clerk and Typist for a thirty day work period.

Frederick L. Schultz, a career State employee, who for nine years was Chief of Laboratory for the Purchasing Agent's testing laboratory, Department of Administration and Finance, was permanently transferred to this Division as Chief of Laboratory.

Thomas Crupi, Senior Engineer and one of our Health Consultants on the 7(c)(1) On-Site Consultation Program resigned to take a position as Director of Health Safety, and Air Pollution with the Plymouth Rubber Company, Canton, Mass.

John N. Lewis, M. D., an officer of the Epidemic Intelligence Service of the Center for Disease Control, Atlanta, Ga., assigned to this Division under the surveillance of the Division's Occupational Hygiene Physician, David H. Wegman, M. D., completed his contract and left to take a position with the Connecticut Department of Health as Director of the Division of Preventable Diseases and Chief of Epidemiological Officer. The Division is indebted to Dr. Lewis for his several epidemiological studies on the effects of carbon monoxide in industrial plants and service garages, as well as a search of tumor registries at various hospitals in an effort to determine the extent and relationship of cancers to industrial exposures.

Two Division chemists, Thomas J. Vegella and Erwin Allen, and two Division engineers, Thomas Crupi and Jack Yee were qualified as Health Consultants under the 7(c)(1) On-Site Consultation Program agreement between the Mass. Department of Labor and Industries and the Occupational Safety and Health Administration of the U.S. Department of Labor.

Robert F. Cashins and Thomas Crupi were certified after examination in the Comprehensive Practice of Industrial Hygiene by the American Board of Industrial Hygiene.

Karen F. Irving, a graduate student at Tufts University, Julie Jankelson and Robbie Lauter, college students joined the Division staff as summer interns. These students were trained in the various disciplines of industrial hygiene and occupational health as part of the Division's summer training program.



The Division of Occupational Hygiene in the Department of Labor and Industries is an official advisory agency of the Commonwealth of Massachusetts established by the legislature in 1934, to investigate conditions of occupation with reference to hazards to health. The Division assists employers, labor, state and local agencies, and all individuals concerned with the prevention of industrial health problems.

The Division is divided administratively into an Engineering Section, a Chemical Section including a laboratory, a Medical and Nursing Section, and an Information Section.

#### GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Doylston Street, Boston.

A total of 774 services were undertaken and 476 requests, including 57 out-of-state requests for information on matters pertaining to occupational health were answered. These services required a total of 896 plant visits, 321 visits to other agencies, and 58 talks and lectures by the Division staff. This is a decrease of 20% for plant visits but an increase of 6% for other field visits.

Field studies involved 4889 measurements of environmental conditions and the collection and analysis of 1161 air samples in places of employment. In addition, the laboratory evaluations included the analysis of 3152 urine samples and 32 material samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U.S. Department of Health, Education and Welfare, and analyzed 120 simulated air samples for asbestos, lead, cadmium, zinc and solvents.

The plant studies and visits resulted in more than 2020 recommendations (25% increase over 1975) potentially affecting more than 55,300 workers. More than 69 follow-up visits revealed the completion of 120 recommendations affecting approximately 9250 workers.



The Massachusetts Department of Labor and Industries entered a 7(c)(1) On-Site Consultation Program with the U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) which provides on-site consultations in health and safety matters at the employers' requests. Under this contract, four staff members (two chemists and two engineers) of this Division provided this service to industries. The program was designed to encourage voluntary compliance. The Health Consultants after the plant or hazard survey for the evaluation of the potential health hazards, provided the employers with a list of apparent OSHA violations and submitted recommendations for the corrections of the deficiencies encountered at the time of the on-site consultation visit.

The 7(c)(1) On-Site Consultation Program was funded on a 50%-50% reimbursable cost basis. Approximately 185 consultative visits were completed during Fiscal 1976. The first year of the contract involved several weeks of training of the Health Consultants by staff members of the OSHA Training Institute. In turn, our Health Consultants gave several lectures and demonstrations of technical equipment to the Safety Consultants of the Division of Industrial Safety.

It is expected that the 7(c)(1) On-Site Consultation Program will continue during Fiscal 1977.

#### ENGINEERING SECTION

##### DIVISION PARTICIPATES IN ENERGY CONSERVATION DRIVE

On July 31, 1975, Governor Dukakis inaugurated an energy-conservation drive, directed at state-owned and rented facilities. The ambitious program will emulate the energy savings (averaging 20%) realized in industry. To bring this about, state employees will be assisted by industry.

Experts who will apply "Value Analysis" techniques to conservation, in workshops and seminars to be held in the future, assure a viable program.





PRIVATE SCHOOL CONTROLS ASBESTOS HAZARD

Approximately one year ago this Division identified a potential asbestos hazard in a private school. The problem was the flaking of asbestos fibers from a sprayed-on ceiling covering. A revisit was made at the request of school officials to advise the school of this Division's opinion of various products which were being proposed to seal in the asbestos material. The proposals call for the spraying of a non-asbestos product over the asbestos material so as to form a complete seal over the asbestos.

The products reviewed in this Division's opinion will seal in the asbestos and eliminate the potential asbestos hazard.

GLASS BOTTLE MANUFACTURING PLANTS SURVEYED

Two members of our staff made visits to two glass bottle manufacturing plants. Both plants are new to Massachusetts and are the only bottle manufacturers in the state. Both plants are fully automated and the only hazards found were exposures to heat and noise.

Selenium is used in both processes but the amounts are quite small.

Both companies were found to have medical and hearing conservation programs.

STATE AGENCY REQUESTS SURVEY

The Division was requested to investigate a lighting problem and a solvent exposure during the operation of a mimeograph stencil machine in an agency of the Commonwealth.

The stencil machine transfers typed material to a carbon sheet through an electrically charged plastic marker.

A very slight odor near the marking pencil was apparent but air tests showed no detectable amount of solvent was present.

It was noted, however, that the stencil machine was located in a rather confined area.



It was recommended that a window fan be installed and the machine relocated to reduce the nuisance problem created by the operation of the machine.

The lighting survey made in an emergency stairwell and library aisles indicated illumination in both areas was largely inadequate.

A recommendation was made to increase wattage of the illumination in the library and stairwell and for better maintenance of fluorescent lighting.

#### MORE COMPANIES REQUEST DELEADING ORIENTATION

Two additional companies, one a private contractor, and the other a non-profit "hard-core" rehabilitation organization requested advice on the prevention of lead absorption by their employees during the deleading of homes presenting a potential lead poisoning hazard.

Groups of workers from each company were instructed in safe working practices, the nature and cause of lead poisoning, and the use of personal protective equipment. Each worker was interviewed by the Division's Occupational Hygiene Physician. A urine sample was obtained from each worker and analyzed for lead content to establish a base-line urinary lead excretion rate. On-job evaluations are being made to determine the potential lead exposure, working practices, and the proper use of respiratory and other protective equipment. Recommendations are submitted to correct deficiencies noted at the time of the job-site visit.

#### COURTHOUSE ASBESTOS PROBLEM INVESTIGATED

This Division, at the request of a county sheriff investigated a potential asbestos problem in a courthouse building.

It was feared that asbestos was flaking off structural beams sprayed with fire-proofing material and contaminating offices and other work areas. Upon investigation, it was determined that false ceilings covered almost all of the sprayed beams and the space above the false ceilings was not being used as a supply air chamber.

Based upon the investigation it was determined that the courthouse did not have an asbestos contamination problem at the present time.



DIVISION PARTICIPATES IN OSHA CONSULTATION PROGRAM

Four staff members, two chemists and two engineers were selected by the Region I, OSHA, administrator, after interview and a review of their training and experience to participate as Consultants in the 7(c)(1) OSHA On-Site Consultation Program. The selected staff members together with twenty-three inspectors of the Division of Industrial Safety were given a three week training course by the OSHA Training Section sent from Chicago, to Massachusetts. The Safety and Health Consultants will service industry in Massachusetts at the request of the employers, advising them on the control of evaluated hazards.

SPRAYED ASBESTOS INSULATION HAZARD CONTROLLED BY TECHNIQUE

A project which could be the first of its kind in the nation has been initiated by a private school in the greater Boston area with the help and guidance of this Division.

The project involves spraying the existing asbestos material with an adhesive to bind the asbestos as tightly as possible. The second phase involves the spraying of a non-asbestos material to form a solid bridge over the asbestos. The outer covering was deemed necessary to totally seal in the asbestos and to provide a protective covering in case students strike the ceiling material with balls, hockey sticks or other objects.

"I" STRUCTURE WRECKERS EXPOSED TO LEAD

As wrecking activities begin on the old elevated Orange Line, an old problem rears its ugly head. Workers cutting steel structures with acetylene torches may be heavily exposed to lead fumes as the many layers of old lead paint are burned. This Division is anticipating the problem by taking lead fume measurements as the work progresses and screening workers for symptoms and for lead levels in the urine.

CIVIL SERVANTS NEED HEALTH PROTECTION, TOO!

This Division has undertaken an aggressive position in performing environmental health surveys for public employees. A case in point is the City of Worcester, where





in response to complaints, a survey was performed of an alleged carbon monoxide intoxication of a worker in a boiler room, also, on the same day, complaints of eye irritation from city-owned blueprint machines investigated. Through measurements we found that hazards were minimal in these areas. However, these findings are more the exception than the rule, for public employees are the least protected segment of the working population.

#### COMMISSION TO INVESTIGATE SCHOOL AND PUBLIC BUILDING USE OF ASBESTOS

The Governor signed Bill H6417 which provides for an investigation by a special Commission relative to evaluating the extent of the use of asbestos as fireproofing insulation in the schools and public buildings of the Commonwealth to determine the potential health hazard. The Director of this Division has been designated as a member of this Commission. The staff of this Division worked closely with the sponsors of this bill, and appeared at the required hearings in favor of this bill.

#### ASBESTOS SURVEY AT BOSTON CITY HALL

Officials from Boston City Hall were concerned that the soundproof insulating material on the ceilings throughout the entire City Hall edifice was asbestos. After analyzing a bulk sample of the insulating material, it was ascertained that the insulating material was asbestos and a potential health hazard existed.

It was then decided that air samples should be obtained to determine the employees' exposure to the asbestos material. Several samples were taken at different locations for a minimum of 24 hours. The evaluation revealed that the employee exposure to asbestos fibers was negligible at this time. It was recommended that this Division be consulted for a future asbestos survey (in 2-3 years) when conditions might be different from what is currently found.

#### HEALTH CONSULTANTS TRAIN SAFETY CONSULTANTS

The entire safety consultants 7(c)(1) staff of the Division of Industrial Safety was given training in the use of direct reading instruments which they may use in plant surveys to spot check apparent health hazards prior to requesting an in-depth



study by this Division.

The training given by our Health Consultants included a discussion of health hazards and the instrumentation requirements for particular hazards or groups of hazards. Also, the training included helpful hints on the field use and maintenance of the equipment. The instruments discussed in this training session included the sound level meter, velometer, noise dosimeter, carbon monoxide detectors, light meters, and the grab sample pump with indicator tubes.

#### HOSPITAL LUNG DISEASE PROGRAM

The Nashoba Valley Community Hospital has begun a program to identify and control lung disease. The program will focus initially on those with chronic lung disease but will evolve into a program of prevention. The Division of Occupational Hygiene was consulted to provide advice on the identification and prevention of occupational respiratory disease. The program is an ongoing one and continued consultation is expected.

#### RADIATION RECORDS-LEGALLY IMPORTANT

The Division's Industrial Radiation Control Supervisor investigated the recent death of a radiation worker at a Massachusetts plant. A relation between the death and work with radioactive materials is being sought by the individual's estate.

This legal action points out the importance of employers' compliance with the radiation regulations of the Commonwealth as well as of the Nuclear Regulatory Commission (Formerly A.E.C.), especially in the keeping of records which pertain to an employee's exposure, as measured by such devices as dosimeters worn on the body, area monitors and air samplers.

#### EXCESSIVE LEAD EXPOSURE AT ELEVATED STRUCTURE DEMOLITION

Workers engaged in the demolition of the MBTA elevated structure in Charlestown and Everett are being exposed to excessive lead fume concentrations. The average exposure is in the range of 5 - 7 Mg of lead per cubic meter with a peak maximum exposure of over 13 Mg/m<sup>3</sup>.



Tests are being conducted to determine a suitable combination of improved respiratory protection and work practice changes so as to reduce the exposures to within acceptable limits.

#### ASBESTOS EVALUATION IN A HIGH SCHOOL

Tests were conducted over a 24-hour period to determine residual ambient air asbestos fiber concentrations in a high school that has made attempts to control an asbestos problem related to flaking of asbestos fibers from structural members sprayed with asbestos fireproofing material.

#### NEWSPAPER ARTICLE TRIGGERS CARBON MONOXIDE INVESTIGATION

The medical writer of the Boston Globe, a local newspaper, after reviewing the Division's files on our investigation of the health hazards at 10 skating rinks, wrote a feature article in the Sunday edition depicting the carbon monoxide hazard and its effects on the skaters, viewers, and the employees of these rinks. Carbon monoxide is emitted by the gasoline powered ice scraping machine equipment sometimes in amounts presenting a serious health hazard. These elevated concentrations of carbon monoxide would not be tolerated in industry. Although our Division is basically interested in the health of the employees of these skating rinks, any direct benefit to them is also a benefit to the general public. A control program consists of the proper tune-up of the ice scraper, adequate ventilation in the starting and repair areas, as well as in the skating arenas. The newspaper article resulted in several requests for surveys at unevaluated skating rinks.

#### TOWN SELECTMEN'S ACTION CREATES HEALTH HAZARD

As the result of a complaint from the mother of a youth skater, a visit was made to an ice skating rink to determine the carbon monoxide concentrations.

It was determined that the skaters were being exposed to hazardous carbon monoxide concentrations. The rink manager advised that he is under orders from the town selectmen not to operate one general exhaust fan at all, and the second general exhaust fan can only be operated 5 minutes per hour. The selectmen made the ruling as the result of complaints from a neighbor who feels the fan noise is excessive.





TALK PRESENTED ON DEMOLITION OF MBTA ELEVATED STRUCTURE

A Senior Engineer from the Division recently gave a talk at an all day meeting of the New England section of the American Industrial Hygiene Association. The talk dealt with the occupational health hazards associated with the demolition of a steel structure which had been painted numerous times with lead chromate paint. Exposure data was presented which showed excessive lead exposures and borderline to excessive chromium exposures. Biological monitoring and various control procedures were also discussed.

POLICE FIRING RANGES SURVEY

The Division is surveying a number of indoor pistol firing ranges to determine the extent of a lead hazard resulting from the firing of pistols.

The data collected indicates that highly excessive lead levels are present throughout the ranges during and after firing. The ventilation provided in all cases has been found to be inadequate.

The only positive finding was that the exposures do not present a serious health hazard due to the fact that most users of the ranges are only exposed for very short periods. The exception to this, however, are range officers or shooting enthusiasts who spend many hours firing or in the range area.

MBTA DEMOLITION PROJECT SURVEY

The Division is continuing to survey the men involved in the demolition of the MBTA elevated structure.

As the result of previous surveys the men are being rotated on a weekly basis to jobs that do not involve a significant lead exposure. The company has also initiated a venous blood lead evaluation program using a private laboratory.

The results of recent air and blood sampling indicate that the exposure to lead during burning operations is excessively high, but the workers' blood lead levels are being held at a consistent level.





A NEW SPORT - A NEW HEALTH HAZARD

At the request of a local town official, a visit was made to an ice skating arena where motorcycle races were being conducted on the ice. The potential hazards evaluated were carbon monoxide and noise.

The races were being conducted by the Northeast Short Track Association.

During practice races before the general public entered the arena, the carbon monoxide level was found to average approximately 120 PPM. Twelve contestants practiced at a time. During the actual races the carbon monoxide level averaged between 30 - 40 PPM.

The carbon monoxide level was controlled by operating the general supply and exhaust fans and by opening a large outside door between races.

The noise level during a race was 106 db(A). The rink owners provide all paying customers with disposable ear plugs when they purchase a ticket.

HEALTH CONSULTANTS ATTEND TRAINING SESSION

The four Health Consultants of the Division of Occupational Hygiene now operating under Section 7(c)(1) of the Federal Occupational Safety and Health Act, attended a four day training session held at the Civil Defense Headquarters in Framingham.

This training session is the first follow-up training to be given by OSHA in the United States, and was designed to answer questions which had surfaced during the first four months of the 7(c)(1) On-Site Consultation Program, and to bring the Health and Safety Consultants of the Department of Labor and Industries up to date on any changes that have occurred since the initial training session.

LEAD HAZARD DURING BRIDGE DEMOLITION

A bridge demolition operation in Newburyport has resulted in all of the burners (6) being exposed to excessive lead absorbance as shown by elevated blood lead levels.

The company was informed that the employees should be rotated off the job until the blood lead levels return to a non-hazardous range. The employees performing burning operations should be required to wear respirators, and all burners should be



rotated to a non-lead job, on a weekly basis.

A follow-up visit will be made to monitor the burners' exposure to lead using air sampling equipment and by blood lead analysis.

#### CARBON MONOXIDE HAZARD DURING CONSTRUCTION

During the construction of an addition to an existing manufacturing company, a potentially serious carbon monoxide hazard was found.

The existing building was being extended. The extension had been constructed and a concrete floor was being installed. This operation involved the use of a bulldozer and up to five automatic concrete trowelers that were gasoline powered.

Employees in the manufacturing area, which was not separated from the construction area in any way, were being exposed to carbon monoxide concentrations in the vicinity of 50 ppm while the construction workers were exposed to levels up to 200 ppm.

Upon being informed of the potential hazard, the employer sent the company employees home early and made arrangements with the construction company to perform the required work on a weekend.

As the result of this survey, the Division will conduct a union wide survey of the cement finishers to determine the extent of the carbon monoxide hazard to the union members engaged in cement finishing in confined and open areas.

#### PUBLIC EMPLOYEES NEED PROTECTION

A Division engineer attempted to conduct a carbon monoxide survey at Logan Airport parking garages. The survey was initiated as the result of an employee complaint.

Massport officials refused to allow the survey to be performed citing the fact that the Department did not have jurisdiction over Massport operations.

#### PROPOSED LEAD HAZARD CONTROL - INADEQUATE

An engineer from this Division met with a town police chief and a sales engineer to discuss the use of a high efficiency filter in conjunction with an exhaust fan to eliminate the lead hazard at a firing range.



Air tests were taken with the proposed system in operation and again without the unit operating. It was found that the unit was not suitable for controlling the lead hazard and did not produce the required velocity at the firing line.

COMPLAINT OF RADIOACTIVE MATERIAL MISUSE - UNFOUNDED

A complaint of misuse of and protection against the hazard of radioactive material was received from an employee of a company engaged in the assembly of approximately 1200 compasses per week containing radioactive tritium gas.

The complaint alleged improper handling and disposal of broken vials, and inadequate control for the radioactive gas escaping from the broken vials.

Our Industrial Radiation Control Supervisor found that adequate precautions were being taken in the assembly, treating, inspecting and packaging of the compasses. Ventilation is provided at all locations where leakage may occur. Urinalyses for approximately thirty employees are analyzed bi-weekly. Routine surveys and adequate supervision should preclude illness from overexposure.

This company's assembly operation was found in compliance with the State and Federal standards.

PROPOSED PROJECT TO SAND BLAST MBTA ELEVATED ORANGE LINE

The MBTA has contracted with a New York based painting company to sandblast and repaint the Orange Line elevated structure from Essex Street to Forest Hills. At the present time a test run has been conducted to determine the feasibility of sandblasting the structure with a canvas shroud enclosing the work area.

A representative of this Division observed the test and left with the impression that many occupational health problems will have to be overcome before the operation can be performed safely.

It was recommended to the MBTA and the City of Boston (they have abrasive blasting regulations) that the sand abrasive be replaced with a less toxic material. Other expected problems include lead and noise hazards.

An effort is being made to have a meeting with all interested parties before the work is started to develop a program to protect the employees and the general





public who live or work in the area.

#### HEALTH CONSULTANTS TRAIN FOR FOUNDRY EVALUATION

Two of the Division's Health Consultants participated in the OSHA sponsored foundry practices training program presented at and by the University of Alabama, Tuscaloosa, Alabama. The course, a requirement for future participation in the National Emphasis Program, was designed for intensive training in foundry procedures and practices. The course was divided into 20 hours of classroom and 20 hours of actual foundry procedures including: sand preparation and properties; core-making; molding and pouring, etc. This course provides the basic knowledge for the future evaluation and control of health hazards in the foundries located in Massachusetts.

#### ON-SITE CONSULTATION PROGRAM EXTENDED

A meeting with the OSHA officials responsible for state programs was held to discuss problems encountered in the present 7(c)(1) On-Site Consultation Program and to negotiate an amended program for fiscal year 1977, which will include use of the Division's laboratory for air samples submitted by the Division's Health Consultants. After submission and review of the proposed budget an amended contract was signed by Commissioner Roussos and the OSHA representatives.

#### GOVERNOR'S ASBESTOS COMMISSION ACTIVATED

The Director and the Senior Engineer attended the first meeting of the Governor's Commission to Investigate the Use of Asbestos in Schools and Public Buildings.

The Director reviewed the results of the Division's surveys in schools and public buildings and recommended several control methods. The Commission is chaired by Rep. Lois Pines, who is responsible for calling the hazards due to asbestos to the Governor's attention. Future meetings of the Commission should result in obtaining sufficient information of the hazard of asbestos for legislative action.

#### DOH LABORATORY TO BE EXPANDED

Plans are underway to refurbish the present laboratory benches and expand the laboratory to the area formerly occupied by the Employment Services Agency.



Funds may be available for the installation of a new double laboratory bench, and the relocation into the new area of some of the new laboratory equipment.

#### LABOR OFFICIAL VISITS DOH

The Deputy Director Labour Welfare, Government of Punjab, Pakistan, Mr. Jiaz Ahmad Khan, visited our Division to discuss his agency's needs for setting up an occupational hygiene service. In addition to reviewing and discussing the essentials of occupational health and industrial hygiene, Mr. Khan was provided with a complete set of our Recommended Safe Practice Bulletins and other information.

#### CHEMICAL SECTION

##### LEAD EXPOSURE ON A FIRING RANGE

The Division was requested to investigate a potential lead exposure on a firing range by a physician who reported that one of his patients, a member of a pistol and rifle club, was found with a blood lead level of 100 micrograms %. Air tests by our staff personnel showed that firing .38 and .45 caliber pistols on this firing range, which was unventilated, produced lead concentrations nearly 100 times the current TLV ( $0.15 \text{ mg/m}^3$ ). Tests taken recently during a (.22. caliber) rifle match showed that lead contamination was much less, but still excessive. Recommendations were made to ventilate the firing range. Fans installed in the target area have greatly reduced the lead exposure problem. A few additional changes are in progress that should adequately control the lead. The firing range will be resurveyed and the lead hazard re-evaluated when the improvements have been completed.

##### MERCURY SURVEY AT BOSTON COLLEGE

A mercury survey of the chemical laboratories at Boston College was made as a result of a request by Dr. Davidovits of their staff. High levels of mercury in the atmosphere were recorded in a chemical stockroom. Droplets of mercury were found in several areas in chemical laboratories where mercury spills had occurred. Clean-up



methods used were not totally effective. Recommendations were submitted for improving the clean-up method.

#### FATAL SOLVENT POISONING

The Division investigated a fatality involving an excessive exposure to a cleaning solvent, 1,1,1 trichloroethane or methyl chloroform. A worker was found unconscious on the floor of a 10' x 12' x 9' unventilated surge pump pit which he was cleaning without respiratory protection and died four days later. The task involved scrubbing and rinsing the stairs and floor of the pit with methylchloroform. The cleaning reportedly usually takes less than an hour and about two gallons of solvent. On the next day of the incident the cleaning period had extended to at least two hours, four gallons of solvent had been used (twice that normally required) and only eight stairs had been cleaned. These circumstances remain yet to be explained. It was obvious, however, when considering the amount of solvent normally required, and the unventilated condition of the pit, that the worker should have worn respiratory protection.

#### COPPER POISONING INVESTIGATION

Four persons became violently ill early one morning within fifteen minutes of ingesting carbonated beverages from a vending machine. The chief symptoms were nausea, vomiting, and general gastric distress. An analysis of the carbonated water in the machine by the Division's laboratory showed it to contain 25 ppm of copper, well above the safe limit (0.2 ppm) and clearly enough, according to literature references, to produce the effects observed. The source of the copper in this case has not been established but litigation on liability is presently in progress. It is most likely that a blockage in the machine allowed carbon dioxide gas from the carbonator to back-up to the building water supply where its acid action corroded copper piping. Fortunately, copper poisoning from this source rarely occurs. All the circumstances surrounding this case have not yet been established.





OSHA TRAINS 7(c)(1) ON-SITE CONSULTANTS

Four members of our Technical Staff and 23 Safety Inspectors of the Division of Industrial Safety attended a three week OSHA training course held at the Soldiers Home in Chelsea.

DIVISION PARTICIPATES IN NATIONAL STANDARDS SETTING

The Chief of Chemical Services of this Division was appointed to the prestigious Threshold Limit Value Committee of the American Conference of Governmental Industrial Hygienists. This Committee is internationally known and recognized for its work in establishing air quality and physical hazard standards. These standards have been adopted by the United States Department of Labor for enforcement by the Occupational Safety and Health Administration (OSHA) in places of employment throughout the United States.

POLYVINYL CHLORIDE PLANT CLOSES

A polyvinyl chloride manufacturing plant in western Massachusetts has terminated its manufacturing operations. OSHA cited this plant just prior to its closing, but this action had no bearing on the decision to halt operations, since the technology of the process (but not the facility) was sold to another firm at least a year ago. Manufacturing was continued in the Massachusetts plant only until a new facility in Illinois was ready. The Illinois installation is now in operation. The old plant facilities which were not part of the purchase agreement will be used to manufacture other products.

"BROWN BAG" CONFERENCES ON OCCUPATIONAL HEALTH

Lunch hour conferences on occupational health are held between 12:30-1:30 p.m. nearly every Wednesday at the Harvard School of Public Health. Attendees have their lunch while listening to timely topics on occupational health which largely reflect the interests of Harvard researchers. Although held primarily for Harvard personnel, the Division's staff was invited to attend. At one session four Division staff members listened to a discussion on "Cancer In the Rubber Tire Industry." At another session one of our chemical staff members attended a discussion centered on vinyl





chloride.

#### PHOSPHINE POISONING ALERT

A case of alleged phosphine poisoning was investigated by our Division. The exposure occurred in a process involving growing gallium phosphide crystals. The actual process is carried out under vacuum and a closed system, but in clearing out the crystal growing chamber a worker was subjected to the exhaust. Afterwards, he complained of symptoms that suggest phosphine poisoning.

Several other workers with similar but milder symptoms were discovered as a result of this investigation. This is a new procedure, but the crystal growing apparatus has been distributed to a hundred companies around the world.

#### TV PROGRAM RESULTS IN MERCURY POISONING

A television program on alchemy led a young couple to experiment at home. They heated about 4 ounces of metallic mercury on their kitchen stove and the results were disastrous. Within a short time they both experienced acute effects of mercury poisoning and were hospitalized. The severity of the exposure and the fact that the woman involved was pregnant aroused the attention of scientists at the University of Rochester who came to Boston to examine the couple and make an initial evaluation of the mercury exposure. They reported extremely high urine and blood mercury levels. Our Division visited the home about a week later and found air levels were generally less than  $0.05 \text{ mg/m}^3$  but contamination on cupboards and window sills was still excessively high. Urine samples collected from the couple a week after the incident showed mercury levels of 0.29 and 0.39 mg/L which are considered to be elevated. A twelve-year old child who also lives at this location but was not directly involved in the experiment was found to have 0.18 mg of mercury per liter of urine. Arrangements were made with the Sylvania Company to make available a MerVac mercury vacuum cleaner. Extensive cleaning with HgX was recommended.

During a recent follow-up visit it appeared that the mercury contamination had been greatly reduced. The Division plan is to continue monitoring this problem by



air tests and urinalyses.

#### CADMIUM POISONING INCIDENT

A case of cadmium poisoning occurred in a fuse-manufacturing operation where a cadmium wire is incorporated into a fuse. Two years ago, several mild cases resulted in an operational change so that all cadmium metal heating was performed in a vented hood. This current case occurred following a move in the location of the hood and incomplete installation of the ventilation system. The patient was a woman who suffered headache, nausea and weakness about eight hours following unknown level of exposure. The recurrence of this exposure prompted the manufacturer to close this intermittent operation until an entirely enclosed and vented operation could be built and installed. This new installation was completed and evaluated by one of our Health Consultants as safe and adequate.

#### CERTIFICATION OF DIVISION INDUSTRIAL HYGIENISTS

The certification examinations given by the American Board of Industrial Hygienists were taken by four staff members of this Division. The senior staff (2) members were granted certification in the Comprehensive Practice of Industrial Hygiene; each junior staff (2) members was designated as Industrial Hygienist in Training and will be eligible for certification after additional experience and upon satisfactorily completing the specialty examination.

These staff members became Diplomates of the prestigious American Academy of Industrial Hygiene.

#### END OF YEAR STAFF MEETING

All staff members attended the "End of Year Staff Meeting" to discuss present survey projects underway and the future plans for each section. The supervisor of the Engineering Section presented up-to-date information on the continuing MBTA demolition project of the elevated structure; the Chief of Chemical Services discussed the investigations made of several firing ranges and the proposed seminar to be given by NIOSH on the control of hazards at firing ranges.



#### ICE SKATING RINK HEALTH HAZARD RESOLVED

A potential carbon monoxide hazard developed in an enclosed ice skating rink when the town Police Department ordered the rink owners to abate a community noise hazard by shutting down the general exhaust fans for the rink. This action was taken after recommendations had been submitted by the Mass. Dept. of Public Health.

Tests taken inside the rink revealed that excessive carbon monoxide levels accumulated in the rink area, due to the lack of general exhaust ventilation.

After discussions with the Department of Public Health and town officials it was agreed that the fans would be operated as needed to control the carbon monoxide in the rink and that the fans would be acoustically treated to eliminate the community noise problem.

#### OCCUPATIONAL ARSENIC EXCESS AT THE WORKPLACE?

A worker who charges a glass furnace was discovered to have high urinary arsenic levels. He was also a seafood eater, and the question arose as to whether this was an occupational or a non-occupational arsenic excess.

An investigation of the workplace suggested no change in operating procedures in 10 years. However, review of the ventilation revealed the possibility that during wintertime reduced ventilation provided for excessive arsenic exposure even with the use of respiratory protection. Laboratory error has not yet been ruled out but the action is being taken to make what corrections are possible in the ventilation.

#### LABORATORY SAFETY MANAGEMENT SEMINAR

The Division's Chief of Chemical Services was one of the principal speakers at the Laboratory Safety Management Workshop held at the State Laboratory Institute in Jamaica Plain. His presentation was entitled Chemical Hazards in the Laboratory and Their Toxicological Effects and included:

- a. mode of entry of chemicals into the human body
- b. physiological classification of poisons
- c. monitoring procedures that should be employed





Specific examples were given. Such hazards as benzene, toluene, carbon tetrachloride, pyridine, aniline, carbon monoxide and many others were mentioned.

The workshop seminar was attended by fifty state laboratory supervising personnel.

#### CARBON MONOXIDE AFFECTS YOUNG SKATERS

On a very warm March afternoon, a number of young ice hockey players complained of headache and nausea after playing a game at a local ice skating rink. One youth received out-patient treatment at a nearby hospital.

These unexpected illnesses sparked a full investigation and survey by this Division. The cause of the illnesses resulted from overexposure to carbon monoxide in the exhaust gases of the gasoline powered ice resurfacing machine.

The skating rink area was found to be contaminated by excessive concentrations of carbon monoxide during the ice resurfacing and for some time after. Inadequate ventilation compounded by a thermal inversion (cold ice and warm air) which trapped the exhaust gases in the skating rink near the ice level caused excessive contamination.

Increased ventilation was recommended. With the prompt cooperation of the owners, this apparently solved the problem.

#### NO PROPHYLACTIC TREATMENT FOR LEAD EXPOSED WORKERS

The National Institute of Safety and Health issued an alert that some physicians may be treating lead exposed workers with chelating agents such as, ethylene diamine, tetra acetic acid (EDTA) and penicillamine prophylactically to prevent elevation of blood lead levels. These chelating agents or similarly acting drugs should be used only in the therapy of the acute symptomatology of severe lead intoxication. There is considerable risk in using the drug prophylactically, particularly to those workers that may be suffering from kidney disease. EDTA has been known to cause kidney problems.

Our Division studied the use of these chelating agents as long ago as fifteen



years. Our staff members have written four papers which were published several years ago.

As a result of this alert physicians in Massachusetts were warned by our staff members through newspapers and radio not to use chelating agents prophylactically and to advise plant management to control the lead exposure so that the workers would not absorb excessive atmospheric lead.

#### CHLOROFORM ALERT ACTIVATES SPECIAL PLANT SURVEY

An alert from the National Institute for Occupational Safety and Health that chloroform had caused cancer in experimental animals prompted an investigation of a plastic film producing plant in western Massachusetts using this solvent in their processes. Workroom air tests to evaluate the potential employee exposure were in a range of 0.2-5.0 parts per million of chloroform per million parts of air, well below the present Threshold Limit Value of 25 ppm. The control of solvent vapor at this plant was found to be adequate, however, the management was advised that chloroform was a suspected carcinogen and that the Threshold Limit Value would probably be lowered. Information was requested from management so that our Division may begin an epidemiological study.

#### TOXIC CHEMICAL PRESENTS HAZARD DURING EXPERIMENTAL RUN

The development of a new plastic sheet product in a Massachusetts plant will require the use of dimethylformamide (DMF) an organic solvent. DMF may affect the liver, other organs, and causes abdominal cramps. The experimental operation involved the production of a plastic sheet which was dried over an unventilated heater. This procedure liberated an excessive amount of DMF vapors resulting in great concern by the employees involved in the experimental run. Since DMF can be absorbed through the skin, special impervious gloves will be required to protect the workers. A properly designated ventilating system will control the solvent vapors emitted during the drying process.



Management was provided with necessary control recommendations and requested to notify this Division of the next experimental run so that our staff may evaluate the health hazard during an actual exposure.

#### ACGIH THRESHOLD LIMITS COMMITTEE MEETING

The Chief of Chemical Services attended a special two day meeting of the ACGIH Threshold Limits Committee in Cincinnati, Ohio. Old TLV's were reviewed and updated where necessary, new standards were introduced which will appear as tentative values in the TLV booklet if approved by the Board of Directors (ACGIH) at the Annual Industrial Health Conference held in Atlanta, Georgia.

#### DOH LABORATORY ACQUIRES A TRACE METALS ANALYZER

The laboratory has purchased and has in operation a new highly sophisticated instrument called an anodic stripping voltammeter. The instrument, in spite of its name, is capable of performing rapidly and accurately lead analyses in blood and urine (2 minutes for urine and 1 minute for the blood analysis). Furthermore, once the instrument is calibrated and standardized it can be operated by non-technical personnel as well. Prior to acquiring this instrument which is more commonly called a Trace Metals Analyzer, analyzing 200 urine samples by our old chemical method required three weeks of a chemist's time. The Trace Metals Analyzer can do the job in two days. In addition to the lead analysis, the instrument can also perform determinations for other metals, and these procedures will be introduced later.

#### SYMPOSIUM ON HEALTH STATISTICS

One of our Health Consultants representing the Division of Occupational Hygiene attended the symposium on occupational health statistics at the Army Materials and Mechanics Research Center, Watertown. The meeting was sponsored by Region I, National Institute for Safety and Health.

The main emphasis of the meeting was on the use of statistical analysis to determine the reliability of test results for measuring air contaminants. Topics covered in the lectures were the number of tests to take, time of tests, errors in test-





ing, and the shortcomings in the test methods. A prepared package of articles, notes, and pamphlets were distributed to the attendees.

#### THE ANNUAL INDUSTRIAL HYGIENE CONFERENCE

The Director and an Assistant Chemist attended the Annual Industrial Health Conference in Atlanta, Ga., where industrial hygienists and related professionals from the United States and several foreign countries heard a total of 225 original papers on the most pertinent aspects of heat stress, noise, airborne particulates, work physiology, toxic substances, carcinogens, radiation and others. This conference had the highest registration ever.

#### MEDICAL-NURSING SECTION

##### MEAT WRAPPERS SYNDROME

As the result of an inquiry from a physician a visit was made to the meat department of a Northshore supermarket to investigate the occurrence of asthma-like reactions of employees engaged in wrapping meat with clear PVC plastic.

The company was aware of the problem and had already taken steps to correct the situation. The solution was to replace the hot wire that is used to cut the plastic wrap with a cooler cutting bar. This change resulted in the elimination of smoke which is generated during the usual hot wire cutting procedure.

The employees advised that conditions are much better since the change-over and most importantly, the asthma-like reactions have been eliminated.

#### EPIDEMIC RASH IN A NURSING HOME

A nursing employee at a Brockton nursing home complained to the Division of Occupational Hygiene that many employees were experiencing a very itchy rash. A diagnosis of scabies, otherwise known as "the itch," had been considered in some of these cases. Two visits to this nursing home revealed that 43 of 68 nursing staff, 5 of 28 other employees, and 24 of 119 patients had recently experienced a bumpy red





rash with severe itching. In consultation with a dermatologist it was concluded that the rash was most likely due to body lice, spread throughout the home by close contact between patients and staff, and within a week almost all cases had been eliminated.

The Mass. Dept. of Public Health, Office of Communicable Diseases, was kept informed of this investigation. The Health Department, at the same time, was investigating reports of scabies among patients and staff at a Brockton hospital from which some of the nursing home patients had been referred. There remains some debate among Brockton physicians whether cases at the hospital and nursing home are all scabies, all louse infestation, or a combination of the two maladies. It is fortunate that the treatment for the two conditions is identical.

~~Attention is called to the fact that the following case is not a typical one.~~

#### PHOSPHINE POISONING CASE INVESTIGATED

A company which developed crystal growing furnaces reported that a laboratory worker had some symptoms suggesting anxiety. He had experienced some strange floating sensations, dizziness, and unsteady gait, and also described palpitations. An irregular heart beat was confirmed by the physician on one occasion. Although this disorder is rare, these are the typical symptoms of phosphine intoxication. The source in this case is phosphorus in the furnace reacting with water vapor to produce phosphine gas.

#### STUDY CARBON MONOXIDE AND HEART ATTACKS

A study is being conducted of the possible relationship between carbon monoxide and heart attacks at work. For this purpose heart attacks at work reported to the Industrial Accident Board are reviewed, and a visit is made to the work place to measure CO levels, test fork lift trucks and other vehicles operating in the area, and take a smoking history on the affected worker. Cigarette smoking complicates the study, as cigarettes generate CO and can contribute to heart attacks.



FUTURE NIOSH PROGRAM MAY INVOLVE MASSACHUSETTS WORKERS

The Division's federally assigned Occupational Hygiene physician, Dr. John Lewis, was at the National Institute of Occupational Safety and Health (N.I.O.S.H.) in Cincinnati, Ohio, as part of a committee to evaluate the N.I.O.S.H. Health Hazard Evaluation program. Any group of workers in the country can request an evaluation by N.I.O.S.H. if they have some reason to think that some aspect of their work presents a health hazard. N.I.O.S.H. has only conducted a few such studies in Massachusetts so far due to a lack of requests.

DOH PHYSICIAN ELECTED TO EDITORIAL BOARD

The Division physician was appointed a member of the Editorial Board of the American Journal of Public Health to serve for the coming year and to represent the particular field of occupational and environmental health.

THE OSHA 7(c) (1) CONSULTATION PROGRAM

The second month, in which members of the Division have been engaged in the 7(c) (1) Consultation Program, has shown a marked increase in the number of employer requests.

The increased response has been a result of Division publicity and personal contact with employer organizations.

It is anticipated that the number of requests will continue to increase, as employers "spread the word", among their business associates.

OCCUPATIONAL HEALTH NURSE PRACTITIONERS GROUP MEET

The following subjects were discussed:

1. The law mandating that all health insurance carriers must include in their health policies provisions of a minimum of \$500.00. for psychiatric aid and thirty days for detoxification or sixty days for mental illness. This law becomes effective January 1, 1976.



2. Confidential records retained in the medical department. Under no circumstances is a medical record to be given or shown to anyone, other than the individual involved, the physician or the responsible nurse. The individual may request, and cannot be denied, a copy of his individual health record. If others (industrial relations managers, personnel managers, supervisors) or any other person, regardless of relationship, wishes to see a medical record, authorization from the individual involved must be obtained, witnessed and dated.

Serious legal consequences can occur if the privacy of an individual is not maintained.

3. The file cabinets of all medical records should have locks, attached to a rod. These locks should be "dial" locks and the number sequence of the dial should only be available to the physician and nurse.

#### CANCER COMMITTEE AND DOH DISCUSS INDUSTRIAL CARCINOGENS

Members of the Occupational Health Committee of the Massachusetts Chapter, American Cancer Society, visited the Division's offices to discuss with our technical staff the present sources of industrial carcinogens, and the Division's epidemiological programs and investigations. The committee reviewed the Division's tumor registry investigations and, the surveys of industrial establishments producing polyvinyl chloride, asbestos products, and other cancer-causing materials. The committee was apprised of our relationship with NIOSH and the system of "CANCER ALERTS", and other important information received from this federal agency.

#### N.I.O.S.H. HAZARD EVALUATION

The National Institute for Occupational Safety and Health (N.I.O.S.H.) is investigating a suspected excess of cancer deaths in a central Mass. chemical plant. This is a project of the Hazard Evaluation Services Branch, in response to a workers' request. Dr. Lewis, a N.I.O.S.H. officer assigned to this Division is involved in the investigation.





#### ANNUAL AMERICAN PUBLIC HEALTH ASSOCIATION

The Occupational Hygiene physician attended the annual APHA meeting to present two papers; one on oat cell cancer of the lung in transport workers and the other on occupational health programs in industry. In addition, he presided over sessions on "Work and Health in a Sick Society" and, "Labor Looks at Occupational Health." Dr. Wegman was elected chairperson of the Occupational Health and Safety Section and has begun to develop a program through this section for, -1) worker occupational health education through health departments, -2) occupational health delivery through neighborhood health centers, and -3) methodologic approach to ascertaining occupational health needs for health planning agencies. The theme of the annual meeting this year was "Work and Health", and over 8,000 of the 25,000 members attended, including Dr. Morton Korn, the new head of OSHA, Dr. J. Finklea, the new head of NIOSH, and Leonard Woodcock, President of the United Automobile Workers Union.

#### CANCER CASES AMONG MICROWAVE WORKERS

Two men who had worked together repairing microwave transmitters used for navigation on military planes developed cancer of the pancreas. This type of cancer is rare in persons less than 40 years of age, and these men were 31 and 34 years old. Microwave radiation has not been reported to be a cause of cancer. A physician with this Division is working with a representative of the National Institute of Occupational Safety and Health (N.I.O.S.H.) in investigating the exposures of these men and seeking medical information on other microwave workers.

#### MEDICAL STAFF PARTICIPATES IN MPHIA MEETING

The Occupational Hygiene Physician and the Supervising Occupational Hygiene Nurse participated in the Massachusetts Public Health Association Meeting held at the Chestnut Hill Country Club.



CONTAMINATED YARN EXPOSES WEAVERS TO ANTHRAX

A concerned weaver who had read in a local newspaper of an anthrax fatality in California telephoned our Division that she believed her weaving yarn was contaminated with live anthrax spores. It was further learned that she had two suspicious skin lesions. Upon examination by our Occupational Hygiene Physician, the lesions proved to be poison ivy.

The contaminated yarn originated in Pakistan and has been widely distributed throughout the country including seven sales outlets in Massachusetts. The distributors are TAHKI Imports of New York, and Creative Handweavers of California. Numerous telephone calls were received from concerned purchasers of this contaminated yarn requesting information on disposal and further handling. Instructions were issued in accordance with intelligence received from C.D.C., Atlanta.

SUSPECTED ANTHRAX EXPOSURE JUST A RUMOR

A cryptic call from the Boston office of the federal Occupational Safety and Health Administration ((OSHA) led us to visit a gelatin factory. The plant uses South American animal bone to make gelatin and animal feed supplement. There have been no suspected anthrax cases at this plant; and F.D.A. cultures taken earlier were negative for anthrax. OSHA had been told by their Washington office that there was a suspected case at this plant. Our investigation revealed that the likely source of this rumor was two cases of skin anthrax at a gelatin factory in New Jersey. That plant used bone imported from Asia.

NEW STATE EMPLOYEE HEALTH CLINIC EVALUATED

At the request of the Assistant Deputy of Administration and Finance, our Supervising Occupational Hygiene Nurse evaluated the physical layout of the new employee health clinic completed recently at the John W. McCormack State Office Building.

The staffing and medical coverage were discussed. Our recommendations will be presented to the Commissioner of Administration & Finance for possible implementa-



tion. The suggestions included a few structural changes. A future meeting will be held to discuss required equipment and medical supplies.

#### MEDICAL STUDENTS GIVEN TRAINING

The Division's policy of cooperating in the training of students in industrial hygiene and occupational health extended to the provision of three weeks training of two University of Massachusetts Medical School first year students by our Occupational Hygiene Physician in On-the-job-training in occupational disease prevention.

#### PAPERS PRESENTED AT EPIDEMICS MEETING

The two Occupational Hygiene physicians working with the Division presented two papers at the annual meeting of the Epidemic Intelligence Service at the Center for Disease Control in Atlanta. Both papers concerned work of this Division with occupational health hazards in the Commonwealth. One was a review of the excessive exposure to lead fume of wreckers dismantling the old Orange Line structure and attempts to control the problem. The second was an analysis of lung cancer deaths suggesting that trucking workers had an increased risk of contracting an unusual form of lung cancer. The papers were well received by an audience primarily concerned with infectious disease epidemics.

#### CANCER AT A CHEMICAL PLANT

Evaluation of an apparent excess of cancer deaths at a large petrochemical complex continues.

Analysis of 397 death certificates of past employees has revealed 85 deaths due to cancer, compared with 66 expected. Most of the excess was accounted for by gastrointestinal cancers. Deaths from cancer of the pancreas in particular were associated with past employment in PVC (polyvinyl chloride) fabrication.

An article on the subject in the "Springfield Union, led to broad press and radio coverage. The publicity has been a source of concern to the company in question but has led to the receipt of additional medical information from workers.





FEAR PSITTACOSIS EXPOSURE OF PET STORE WORKERS

It was learned that three parrots at a Brookline pet shop had died with what was thought by experts to be psittacosis (parrot fever). As their illness is transmitted to humans from parrots and may be fatal, this Division promptly took steps to protect the pet shop workers. In addition, the Department of Health and the Department of Agriculture (Division of Animal Health) were informed of the problem. Unfortunately, the shop owner was reluctant to take protective measures and continued selling parrots. The shop eventually had to be closed by the local health department. There have been no additional cases in parrots or humans reported. The Division of Industrial Safety Inspector is taking steps to protect co-workers.

INDUSTRIAL TOXICOLOGY LECTURE TO NURSES

The Chief of Chemical Services presented two three-hour lectures to nurses in the nurse practitioners' course at the Boston University School of Medicine. Eight industrial nurses are enrolled in this graduate course which is held two days a week for a period of 15 weeks. After completion of the course, they will practice nursing in expanded roles of providing physical examination, supervising proper job placement and administering health and safety programs.

SURPLUS MEDICAL SUPPLIES RECEIVED

The cessation of activities at the Foxboro State Hospital, Foxboro, resulted in a surplus of a large quantity of equipment and supplies.

Our Supervising Occupational Hygiene Nurse, at the request of the Assistant Budget Director, Administration and Finance, selected sufficient equipment and supplies to stock the first aid facilities of the two State Office Buildings in Government Center, Boston, and also provided some supplies for our first aid and laboratory facilities.

CHEMICAL-NUCLEAR PLANT RECEIVES D.O.H. ADVICE)

The Division's Director and Chief of Chemical Services were requested by the management of a chemical-nuclear plant to survey its industrial hygiene sampling





needs.

Recommendations for establishing an industrial hygiene laboratory were made, the essential equipment for such a laboratory was listed, and an air sampling program was outlined.

#### SUMMARY OF NURSING ACTIVITIES

The Supervising Occupational Hygiene Nurse made 156 company visits, averaging 7 recommendations at each location.

There were 27 professional meetings attended, 9 workshops, 11 lectures were given, and 8 visiting nursing associations were assisted to establish occupational health services.

Six hospitals were assisted with their employee health services.

A survey was conducted at the state office building relative to the health services available, at that location, for state employees and transients. A new medical unit was established in the McCormack State Office Building.

Five new nursing services were established in industries.

Assistance was given to Boston University School of Nursing, continuing education, for the only occupational health nurse practitioner course in the country.

Five Nursing Data Sheets completed-there are now 9 data sheets available for industry.

Sixty-four student nurses were placed in occupational settings for their experience in Community Health.



SOURCES OF INQUIRY

<u>Source</u>	<u>Services</u>	<u>Information</u>	<u>Total</u>
Division of Industrial Safety	131	10	141
Follow-up	69	--	69
Radiation surveys	140	--	140
Self-Initiated	120	--	120
Employer	101	183	284
Labor Union-Worker	55	21	76
Government, N.O.C.	37	70	107
Physicians-Hospitals	32	29	61
Consultants-Contractors	4	15	19
Education-Research	11	39	50
Suppliers	0	1	1
Professional Organization	2	9	11
Insurance	5	12	17
Publisher	3	5	8
Non-Official Agency	2	17	19
Attorneys	2	16	18
OSHA	1	5	6
Nurse	1	2	3
Trade Associations	10	1	11
Transportation	1	--	1
N.O.C. (Tenants, etc.)	8	31	39
Industrial Accident Board	39	1	40
Libraries	<u>1</u>	<u>9</u>	<u>10</u>
	774	476	1251

Includes:

Out of State Requests	57	57
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FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONS

HARMFUL SUBSTANCES AND CONDITIONS

Acetone	2	Dimethylformamide	3
Aldehydes, N.O.C.	2	Dust, N.O.C.	20
Aluminum	1	Ethyl Ether	2
Amines, N.O.C.	1	Ethylene Diamine	2
Ammonia	21	Fibrous Glass	1
Amyl Acetate	2	Flour Dust	2
Anthrax	1	Flourides, N.O.C.	1
Antimony	3	Formaldehyde	6
Arsenic	6	Foundry Dust	1
Asbestos	33	Freon	2
Asphalt Fumes	1	Fumes, N.O.C.	1
Benzene	1	Gases, N.O.C.	3
Beryllium	3	Glue	1
Cadmium	7	Granite Dust	2
Cancer/Carcinogens	11	Hand Injuries	4
Carbon Black	2	Heart Attacks	7
Carbon Dioxide	1	Heat Stress	6
Carbon Monoxide	59	Hydrochloric Acid	2
Chlorine	1	Illumination	1
Chloroform	1	Iron	6
Chromic Acid	1	Lead	101
Chromium	9	Lead Chromate	1
Copper	3	Mercury	35
Cutting Oil	1	Mercaptane	1
Cyanide, N.O.C.	12	Methyl Cellosolve	1
Cyclohexanone	2	Methyl Chloroform	2
Dermatitis	11	Methylene Chloride	5
Dialysis Dementia	2	Methylene Bisphenyl Isocyanate	4





Methylene Dianiline	1	Toluene	27
Methyl Ethyl Ketone	19	Toluene Diisocyanate	18
Methyl Isobutyl Ketone	1	Total Oxidants, N.O.C.	2
Microwaves	9	Triethylene Amine	1
Naphtha	6	Trichloroethylene	8
Nickel	3	Ventilation	147
Nitrogen Dioxide	12	Vinyl Chloride	13
Noise	108	Welding Fumes	9
Oil Mist & Smoke	5	Wool Dust	1
Ozone	6	X-Radiation	53
Perchloroethylene	12	Xylene	18
Pesticides, N.O.C.	2	Zinc	7
Petroleum Distillates	8	Zinc Chloride	1
Phenol	3	Zinc Stearate	1
Phosphine	6		
Psittacosis	1		
Radioactivity	87		
Selenium	2		
Silica	7		
Silver	2		
Solka Dust	1		
Solvents, N.O.C.	34		
Sulfiles, N.O.C.	2		
Sulphuric Acid	1		
Styrene	5		
Talc	1		
Teflon	1		
Tetrahydrofuran	1		
Tin	2		



<u>CHEMICALS</u>	<u>NUMBER</u>	<u>IN HARMFUL EXPOSURE RANGE</u>
Alcohol, N.O.C.	3	0
Ammonia	3	0
Carbon Monoxide	628	379
Cyanides	1	1
Formaldehyde	2	0
Hydrocarbons, N.O.C.	1	0
Hydrogen Sulfide	4	0
Mercury	298	77
Methylene Chloride	15	0
Methyl Ethyl Ketone	71	36
Petroleum distillate	25	0
Solvents, N.O.C.	52	5
Styrene	10	0
Sulfides N.O.C.	2	0
Tetrahydrofuran	4	0
Toluene	48	21
Trichloroethylene	5	3
Xylene	12	5
Welding Fumes	1	0
<u>Ventilation</u>	1264	544
TOTAL	4889	2636



AIR SAMPLES COLLECTED

1. DUSTS

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Aluminum Oxide	2	0
Asbestos	27	3
Carbon Black	4	1
Dust N.O.C.	17	1
Flour dust	4	0
Foundry dust	7	4
Granite dust	2	0
Iron oxide	51	7
Nickel dust	2	0
Silica	4	3
Solka dust	4	0
Stone dust	14	7
Talc	4	0
Wool dust	2	0
Zinc stearate	2	0
	<u>146</u>	<u>26</u>





AIR SAMPLES COLLECTED

<u>Substance</u>	<u>2. CHEMICAL Number</u>	<u>In Harmful Range</u>
Acetone	6	0
Aldehyde, N.O.C.	3	0
Amines, N.O.C.	2	0
Ammonia	18	0
Amyl Acetate	3	0
Antimony	8	0
Benzene	2	0
Cadmium	1	0
Carbon dioxide	1	0
Chloroform	13	0
Chromium	68	6
Chlorine	2	0
Copper	9	7
Cyanide	7	0
Cyclohexanone	1	0
Diethyl ether	1	0
Ethylene amine	4	0
Fluorides	9	2
Formaldehyde	6	0
Freon	2	0
Hydrochloric acid	5	0
Hydrogen dioxide	3	0
Lead	229	164
Lead chromate	3	0
Mercury	2	0
Methyl Cellosolve	3	0
Methylene Bisphenyl Isocyanate	10	2



<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Methyl Ethyl Ketone	16	2
Methylene Chloride	17	1
Naphtha	7	0
Nitrogen Dioxide	12	2
Oil Mist	1	0
Ozone	11	1
Perchloroethylene	21	2
Selenium	1	0
Silver	3	0
Stoddard Solvent	18	0
Sulfuric Acid	3	0
Styrene	6	2
Toluene	51	3
Toluene Diisocyanate	43	17
Total Hydrocarbon	1	0
Total Oxidants	10	0
Trichloroethylene	12	2
Triethylene Amine	10	0
Vinyl Chloride	18	0
Welding Fume	10	5
Xylene	20	3
Zinc	41	1
TOTAL	753	222



LABORATORY WORK

AIR SAMPLES

Chemical	1161	1307
Dusts	146	

Material Samples

32

Chemical	6
X-Ray Diffraction	4
Microscopic	20
Infra Red	2

Smear Samples

2

Chemical	2
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Urine Samples

3152

Cadmium	18
Chloroacetic Acid	506
Lead	1819
Mercury	785
Trichloroacetic Acid	24

Proficiency Analytical Testing Program

120

Asbestos	24
Lead	24
Cadmium	24
Zinc	24
Solvents	24

TOTAL

4613





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1. Recommended Safe Practices, Ventilation Data Sheet No. 1,  
"Planers." Bulletin, September 1975. 1 p.
2. Recommended Safe Practices, Physical Data Sheet No. 13,  
"Strontium 90." Bulletin, September, 1975. 2 p.
3. Recommended Safe Practices, Chemical Data Sheet No. 23,  
"Sulfur Dioxide." Bulletin, September, 1975. 1 p.
4. Recommended Safe Practices, Nursing Data Sheet No. 3,  
"Eye Safety Program." Bulletin, September, 1975. 1 p.
5. Recommended Safe Practices, Nursing Data Sheet No. 2,  
"Information Concerning Pregnant Employees." Bulletin, September, 1975. 1 p.
6. Recommended Safe Practices, Nursing Data Sheet No. 4,  
"Epilipsy." Bulletin, October 1975. 2 p.
7. Recommended Safe Practices, Chemical Data Sheet No. 35,  
"Ozone." Bulletin, October, 1975. 1 p.
8. Recommended Safe Practices, Chemical Data Sheet No. 24,  
"Cyanides." Bulletin, October, 1975. 2 p.
9. "OSHA-7(C)(1) On-Site Consultation Program."  
Bulletin, October, 1975. 1 p.
10. Recommended Safe Practices, Nursing Data Sheet No. 5,  
"Emergency Medical Transportation." Bulletin, November, 1975. 1 p.
11. Recommended Safe Practices, Mineral Data Sheet No. 8,  
"Aluminum Oxide." Bulletin, November, 1975. 1 p.
12. Recommended Safe Practices, Physical Data Sheet No. 16,  
"Iridium 192." Bulletin, November, 1975. 3 p.
13. Recommended Safe Practices, Nursing Data Sheet NO. 6,  
"Recommended First Aid Supplies." Bulletin, December, 1975. 2 p.
14. Recommended Safe Practices, Nursing Data Sheet No. 7,  
"First Aid Log." Bulletin, December, 1975. 1 p.



15. Recommended Safe Practices, Physical Data Sheet No. 5,  
"Noise." Bulletin, January, 1976. 2 p.
16. Recommended Safe Practices, Chemical Data Sheet No. 2,  
"Carbon Tetrachloride." Bulletin, March, 1976.
17. Recommended Safe Practices, Chemical Data Sheet No. 9,  
"Mercury." Bulletin, March, 1976. 2 p.
18. Recommended Safe Practices, Chemical Data Sheet No. 6,  
"Carbon Monoxide." Bulletin, March, 1976. 2 p.
19. "Vinyl Chloride: Can the Worker Be Protected?"  
New England Journ. of Medicine, 294:653-657 (March 18), 1976.
20. Recommended Safe Practices, Ventilation Data Sheet No. 7,  
"Dusting Rooms." Bulletin, March, 1976. 1 p.
21. Recommended Safe Practices, Chemical Data Sheet No. 11,  
"Fluorides." Bulletin, March, 1976. 1 p.
22. "Medical Examination of Personnel Exposed to Ionizing  
Radiation." Bulletin, March, 1976. 2 p.
23. Recommended Safe Practices, Chemical Data Sheet No. 3,  
"Benzene." Bulletin, April, 1976. 1 p.
24. Recommended Safe Practices, Physical Data Sheet No. 14  
"Tritium." Bulletin, May, 1976. 1 p.
25. Recommended Safe Practices, Ventilation Data Sheet No. 3,  
"SPRAY BOOTHS." Bulletin, May, 1976. 2 p.
26. Recommended Safe Practices, Chemical Data Sheet No. 12,  
"Cadmium." Bulletin, June, 1976. 1 p.



PUBLICATION (Cont'd)

27. "The Silent Hazard: An Unusual Case of Mercury Contamination of a Dental Suite." JADA, 92:1195-1198, June, 1976.









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# The Commonwealth of Massachusetts

MICHAEL S. DUKAKIS, *Governor*

Executive Office of Manpower Affairs

Howard N. Smith, *Secretary*

DEPARTMENT OF LABOR AND INDUSTRIES

NICHOLAS ROUSSOS, *Commissioner*

DIVISION OF OCCUPATIONAL HYGIENE

HAROLD BAVLEY, P.E., *Director*

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# ANNUAL REPORT 1977

GOVERNMENT DOCUMENTS  
COLLECTION

APR 1978

Originating Office

MICHAEL S. DUKAKIS

Department of Labor and Industries, Division of Occupational Hygiene

39 Boylston Street, Boston, Massachusetts 02116



ANNUAL REPORT  
OF THE  
DIVISION OF OCCUPATIONAL HYGIENE  
FISCAL YEAR 1977

This Annual Report records the program and activities of the Division of Occupational Hygiene of the Department of Labor and Industries for the fiscal year beginning July 1, 1976, and ending June 30, 1977.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES.

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Harold Bavley, B.S., P.E., Director  
David H. Wegman, M.D., Occupational Hygiene Physician  
Leonard D. Pagnotto, M.S., Chief of Chemical Services  
Frederick L. Schultz, Chief of Laboratory  
Rexford G. Alexander, B.S., Senior Industrial Sanitary Engineer  
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor  
Jack Yee, B.S., Senior Industrial Sanitary Engineer  
Max Richmond, B.S., Senior Chemist  
Henry L. Smith, B.S., Senior Chemist  
Anne Ackerman, R.N., Supervising Occupational Hygiene Nurse

Publication No. 10595

Approved by Alfred C. Holland, State Purchasing Agent



Thomas Vegella, B.S., Assistant Industrial Hygiene Engineer  
Erwin Allen, B.S., Assistant Chemist  
Bernice Linde, B.S., Head Clerk  
Louise M. Lydon, Senior Library Assistant  
Olga V. Stripinis, Senior Clerk and Stenographer  
A. Rae Yudis, Senior Clerk and Stenographer  
Mary S. Chin-Lim, Senior Clerk and Typist

The following personnel changes occurred during Fiscal 1977:

Frederick L. Schultz, Chief of Laboratory was upgraded to Grade 23.

Erwin Allen was promoted to Assistant Chemist.

Thomas J. Vegella was promoted to Assistant Industrial Hygiene Engineer.

Jack Yee was promoted to Senior Industrial Sanitary Engineer.

Robert F. Cashins, Senior Industrial Sanitary Engineer, who supervised the activities of the Engineering Section of this Division resigned to take a position with Bolt, Beranek & Newman Company, acoustical consultants, who received a large contract from OSHA for survey of foundries outside of Massachusetts.

Roger P. L'Heureux, Industrial Radiation Control Supervisor, resigned his position to seek employment elsewhere. He was replaced by Frank R. Archibald, an electronics engineer who successfully passed the civil service examination for this position.

Rexford G. Alexander, a certified industrial hygienist was hired to fill the vacancy of Senior Industrial Sanitary Engineer.

Harold Bavley, Director, was appointed as a member of the Legislative Asbestos Commission which was instituted by the State Legislature to investigate the use of asbestos as fire-proofing in schools and public buildings and its potential hazards resulting from such use.

Julie Jankelson, a student of Hampshire College, Amherst, returned as a summer intern. Her training continued in the various disciplines of industrial hygiene and occupational health as well as participation in an epidemiological study under the guidance of the Division's Occupational Hygiene Physician, Dr. David H. Wegman.





The Division of Occupational Hygiene in the Department of Labor and Industries is an official advisory agency of the Commonwealth of Massachusetts established by the legislature in 1934, to investigate conditions of occupation with reference to hazards to health. The Division assists employers, labor, state and local agencies, and all individuals concerned with the prevention of industrial health problems.

The Division is divided administratively into an Engineering Section, a Chemical Section including a laboratory, a Medical and Nursing Section, and an Information Section.

#### GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston. An additional 1150 square feet located on the ninth floor were added for needed laboratory and office space.

A total of 978 services were undertaken, 440 in-state requests, 42 out-of-state requests for information on matters pertaining to occupational health were answered. These services required a total of 993 plant visits, 247 visits to other agencies, and 32 talks and lectures by the Division staff. This is an increase of 10.8% for plant visits but a decrease of 23% for other field visits.

Field studies involved 5971 measurements of environmental conditions and the collection and analysis of 1041 chemical and 324 dust air samples in places of employment. In addition, the laboratory evaluations included the analysis of 3453 urine samples, and 69 material samples, 806 blood samples, 10 breath samples, and 3 smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U.S. Department of Health, Education and Welfare, and analyzed 100 simulated air samples for asbestos, lead, cadmium, zinc and solvents.

The plant studies and visits resulted in more than 1759 recommendations (12.9% decrease over 1976) potentially affecting more than 63,482 workers. Follow-up visits revealed the completion of 70 recommendations affecting approximately 5280 workers.



The Massachusetts Department of Labor and Industries continued the 7 (c)(1) On-Site Consultation Program sponsored by the U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) which provides on-site consultations in health and safety matters at the employers' requests. Under this contract, four staff members (two chemists and two engineers) of this Division provided this service to industries. The program was designed to encourage voluntary compliance. The Health Consultants after the plant or hazard survey for the evaluation of the potential health hazards, provided the employers with a list of apparent OSHA violations and submitted recommendations for the corrections of the deficiencies encountered at the time of the on-site consultation visit.

The 7 (c)(1) On-Site Consultation Program was funded on a 50%-50% reimbursable cost basis. Approximately 249 consultative visits were completed during Fiscal, 1977. The second year of the contract involved two weeks of training of two of the Health Consultants by staff members of the University of Alabama, Tuscaloosa, Alabama, in foundry practices as a preparation for investigation and survey of ferrous and non-ferrous foundries in Massachusetts under the National Emphasis Program, initially directed towards the control of health and safety hazards in operating foundries. There were fifty-seven (57) visits out of a designated 84 foundries made in conjunction with the Safety Consultants of the Division of Industrial Safety as mandated under the special foundry program as part of the 7 (c)(1) On-Site Consultation Program.



ENGINEERING SECTION

SPECIAL MBTA "ORANGE LINE" CONFERENCE

Job-site air tests showing excessively high lead exposure to abrasive workers on the MBTA renovation project, resulted in the Division's request for a meeting with the contractor, MBTA and union officials. This meeting was attended by the Division Director and the Supervising Senior Engineer.

The elevated air test results and the urinalyses for lead excretion rates were discussed. It was agreed that airline respirators with hoods, or lightweight positive pressure blasting helmets, with a filtered air supply, would be used by the blasters while other indirectly exposed workers would wear approved dust respirators. Urine and blood samples would be obtained from the workers and delivered to the Division's laboratory. The union official would meet with the workers and explain the various safety and health requirements for the job. Our technical personnel would maintain medical and engineering surveillance.

EYE IRRITATION PROBLEM - PERPLEXING

A Division engineer recently visited a Circuit Board Manufacturing Plant to investigate the cause of intermittent eye irritation in the precious metal plating area.

The cause of the irritation has been narrowed down to a lack of general ventilation in the plating area, contaminants being entrained into the room through an air conditioner located adjacent to a plating line exhaust, or from fumes being generated at an electroless plating operation.

Air sampling equipment has been loaned to the company so that air samples can be collected whenever the irritation occurs. The information obtained as a result of the company sampling should answer the question of the location of the source and a possible solution of the problem.





SPECIAL SPRAYED MATERIAL TO PREVENT CONTAMINATION

The Clerk of Works for a high school renovation job contacted this department seeking information as to the best methods available to control asbestos contamination from a ceiling that had been sprayed with an asbestos fireproofing material.

The contractor on the job proposed to spray the asbestos with a sodium silicate solution to form a hard crust over the asbestos. A false ceiling would then be hung to cover the present asbestos ceiling material.

It was agreed that the procedure outlined would control the asbestos problem as well as any other known procedure except complete removal.

A follow-up visit was made to check the ability of the sodium silicate to seal the asbestos.

TRIPOLI CONTROVERSY SETTLED

The Vice President of an abrasives manufacturing company located in Connecticut visited this office to discuss the health effects of Tripoli, which is a constituent of the abrasive products being manufactured.

The company felt that Tripoli was a non-toxic material and advised customers in Massachusetts accordingly. However, after the Division laboratory ran an analysis, it was found that Tripoli is essentially crystalline free silica.

The results of the meeting were that the company agreed that the product was a toxic material and that they would treat it as such.

CONTROL OF ASBESTOS HAZARD AT SALEM STATE COLLEGE

The Senior Engineer arranged to have the Safety Director at Yale University visit the Salem Campus to provide guidance as to the proper method for removing the asbestos containing acoustical material because of his experience with such a project at a Yale dormitory.

It was agreed that the asbestos product would be removed by wetting the material down and hand scraping. Clean and dirty areas will be set up and posted. The employees engaged in the removal will be trained and provided with personal





protective equipment. Arrangements will be made to have the asbestos waste material disposed of in an approved land fill.

School authorities advised that the operation will be performed during the Christmas vacation when the students and faculty are on leave.

#### CONFERENCE WITH OSHA OFFICIALS

The newly appointed Regional Administrator for New England, Mr. Gilbert J. Saulter, and Mr. Edward Riley, in charge of State Programs for OSHA met with Commissioner Roussos and the Directors of Industrial Safety and Occupational Hygiene to discuss the present 7(c)(1) On-Site Consultation Program. Closer cooperation between the State and this Federal agency is indicated.

#### SURVEY REVEALS MICROWAVE HAZARD

Pursuant to a request from a food vending service company, a consultative visit was made to a plant where one of the vending service company's microwave oven was being employed.

The oven was evaluated for microwave leakage with an electromagnetic radiation monitor and was found to be leaking in excess of the maximum capacity of the monitoring instrument (200 milliwatts per square centimeter). What was more alarming was that this reading was obtained about twenty centimeters from the surface of the oven. It was concluded that at five centimeters from the oven's surface the reading would have been in the thousands of milliwatts per square centimeter. (The Federal standard under Public Law 90-602 is five milliwatts per square centimeter at a distance of five centimeters from the surface of the oven.)

Following the evaluation, the oven was immediately removed from service, and the vending company was notified. An employee of the vending service company arrived and hauled the microwave oven away to the service shop within ten minutes after the notification.



SEMINAR UPDATES SOLUTION OF VENTILATION PROBLEMS

The DOH Senior Engineer attended the "Ninth Annual Industrial Ventilation and Air Pollution Control Conference," which was conducted at the University of Connecticut, Storrs, Connecticut, between October 17, and October 22, 1976.

Some of the topics covered included: ventilation systems design, characteristics of various fans; noise reduction of ventilation systems; theory of capture velocity; air clearing equipment; OSHA regulations; EPA regulations; make-up air; future requirements for energy conservation; and the various methods of evaluating ventilation systems.

HEALTH CONSULTANTS COMPLETE NEP COURSE

Two of our Health Consultants operating under the 7(c)(1) On-Site Consultation Program completed the National Emphasis Program course for Industrial Hygiene Consultants sponsored by the U.S. Department of Labor, Occupational Safety and Health Administration, held at the OSHA Training Institute in Rosemont, Ill.

The course included lectures on Administrative Procedures; Knowledge of Small Business Administration; Hazardous Materials; Process Descriptions; Human Communications and health hazards as noise and pneumoconiosis; ventilation problems, foundry control of health hazards, etc.

Our Health Consultants will make joint surveys with the Safety Consultants of the Division of Industrial Safety of all ferrous and non-ferrous foundries in Massachusetts.

NO SAND BLASTING IN HOME DELEADING

A Boston-based company engaged in deleading homes in the city discussed the advisability of using abrasive blasting on the interior of houses to facilitate the deleading operation.

Management was advised of the extreme contamination health hazard associated with this type of operation and the need for safeguarding the workers and occupants during and after such an operation. In view of the potential serious health hazard



and the cost to control such an operation, it was recommended that sand blasting be prohibited during the deleading of homes. An evaluation of a disc sanding operation which was undertaken to speed-up and facilitate the deleading operation revealed excessive contamination of the working and adjoining areas. This operation was discontinued upon request of this Division.

#### ANNUAL INDUSTRIAL HYGIENE MEETING

Several staff members attended the annual meeting of the New England Section of the American Industrial Hygiene Association held at the Marriott Hotel, Newton. The theme of this annual technical conference was "Environmental Carcinogens." Several outstanding speakers presented technical papers on such diverse aspects of these serious health hazards, as: "Analyses of Incinerator Stack Gases for Polychlorinated Biphenyls (PCB): Asbestos Measurements Comparison; Polynuclear Aromatic Hydrocarbons; Mechanism for Halo-Olefin Carcinogenicity; several other papers and a panel discussing the government and private outlook on the control of carcinogens.

#### SURVEY REVEALS EXCESSIVE MICROWAVE OVEN LEAKAGE

At the request of a food vending service company, which was concerned about the amount of microwave leakage emanating from their microwave ovens, a survey was conducted at all the company's client locations.

A total of over twenty-five ovens were evaluated during the course of the survey and, alarmingly, over fifty per cent exhibited microwave leakage in the range from one to over forty times the amount allowed by Federal regulations. These defective ovens were removed from service and the food service company notified.

As a result of the survey, this Division is in the process of writing an addendum to the current "Microwave", Recommended Safe Practice Bulletin, with the emphasis on high-volume users such as, fast-food restaurants and employee cafeterias.

#### GAS TANK DEMOLITION PRESENTS SEVERE LEAD HAZARD

A resident physician of the Massachusetts General Hospital advised the Division that she was treating a worker who is engaged in the demolition of expansion





type gas tanks, for lead absorption. His two co-workers were hospitalized at the Beth Israel Hospital, Brookline, at about the same time for treatment of lead absorption.

A three man crew uses oxy-propane torches to cut the painted steel tops and the holding tanks owned by different gas companies. Considerable lead fume is generated when the high temperature flame cuts through the lead-base painted structure.

The air tests taken at the place of operation revealed the need for airline respirators or similar respiratory protection.

Recommendations for approved and adequate equipment, personal hygiene and proper work clothes were submitted to the employer. These employees will be kept under surveillance by our staff members until the demolition jobs are completed. Blood and urine analyses will be performed by this Division.

#### WRONG SHIPMENT CAUSES RADIATION OVEREXPOSURE

The Division's Industrial Radiation Control Supervisor accompanied U.S. Nuclear Regulatory Commission (NRC) representatives on a visit to an institution of advanced learning in the Boston area. During the visit it was learned that the institution had erroneously received a volatile organic chemical compound containing 4.8 curies of tritium in lieu of 10 millicuries of tritium, in a spironolactone compound, as ordered. The received shipment was mislabeled as containing 10 mci tritium. The package was received at the institution on April 28, 1976, and opened by a graduate student for whom the compound was ordered. Approximately 1.25 ml was removed by the graduate student who made a 3 fold dilution.

The erroneous shipment was made by a well known supplier of radioactive, by-product materials. Two separate compounds containing 10 millicuries and 4.8 Ci quantities of tritium were prepared by the supplier's chemist who cross labeled the compounds. The customer who ordered the compound with 4.8 Ci of tritium received the compound with 10 micro curies but labeled 4.8 Ci. This customer subsequently contacted the supplier for correction. The supplier realized that a serious error



been made and arranged to pick up the mislabeled compound from the institution on June 4, 1976. An immediate survey was made without any detectable contamination found within the laboratory in which the graduate student worked. A urine sample was also taken from the graduate student on June 4, 1976, and found to contain 1.716 micro curie per liter of tritium. A subsequent sample was reportedly taken on June 14, and found to contain 0.966 micro curie/liter and an effective half life of 12 days. This finding indicates by calculation that the graduate student may have taken in a total of 13.7 micro curie/liter if he had ingested this material on April 28, 1976. Urine samples taken from other laboratory personnel indicated no detectable amount of radioactivity.

The supplier notified NRC by letter of the incident and the apparent violation of applicable federal regulations on the shipment of 4.8 curies to a customer with a 10 milli curie possession limit. NRC was also advised of the incident by the institution's radiological consultant. Meanwhile, the graduate student has retained legal services in an action against the supplier, primarily for damages attending loss of experimental time associated with graduate work.

#### MASSACHUSETTS ASBESTOS COMMISSION FILES FIRST REPORT

The first interim report of the Legislative Special Commission on Asbestos, chaired by Representative Lois Pines, of Newton, was filed with the clerk of the Massachusetts House of Representatives. The Commission was appointed to evaluate the extent of the use of asbestos as fireproofing and insulation in the schools and public buildings within the Commonwealth. The report reviewed the legislative order creating the Commission, membership of the Commission (The Director of Occupational Hygiene is a designated member) the present problems, and the health effects of asbestos inhalation.

Simultaneously, a New Jersey newspaper headline revealed that a physician in that state had linked a student's respiratory illness with the inhalation of asbestos



in a school attended by his patient.

Subsequent newspaper publicity resulted in a demand for the shut-down of a group of schools until a survey had established the safety of the school children.

MASSACHUSETTS RADIOGRAPH COMPANY FINED BY FEDERAL AGENCY

The Nuclear Regulatory Commission (NRC) proposes to fine a Massachusetts Radiography Company \$45.00 for failure to comply with requirements for protecting workers from overexposure to radiation. This action arises from an unusual incident that occurred during early November, 1976, and was jointly investigated by representatives of NRC and this Division.

A company radiographer working with and transporting a radioactive iridium source used to examine fuel lines on a remote part of Logan Airport failed to completely retract the radioactive source into its protective shielding after use. Unaware that the source was exposing him to radiation, the worker loaded it into a small truck and drove home, parked the truck there overnight, and returned it to the company the next day, where the problem was discovered. A child member of the radiographer's family is deemed to have received an exposure of 114 millirems in a 24-hour period. Regulations limit such non-occupational exposures to 100 millirems per week.

The undue radiation exposures are attributed to the failure of the company employee, who at the time was feeling sick, to perform certain routine, precautionary measures. Among the routine steps that were not accomplished was the worker's failure to make a check with a survey meter after the source was cranked back into its shielded position, failure to check and record his dosimeter at the end of the day and failure to return the iridium source to the company's facilities immediately after completion of the field job.





#### DOH AUDITS HARVARD RADIATION COURSE

The Industrial Radiation Control Supervisor audited a recent course conducted by the Division of Environmental Health and Safety, at Harvard University. The course consisted of three afternoon sessions and was essentially an orientation program for technicians using radioisotopes. The first session was conducted by Dr. Jacob Shapiro, and reviewed radiation protection principles. The second session was conducted by Mr. Robert Johnson, and treated with the practical aspects of radiation. The first two sessions were held at Harvard Medical School in Boston. The third session was held in the laboratory facilities of Harvard University Health Services, Holyoke Center, Cambridge. This latter session consisted of laboratory demonstrations and student participation. Among the subjects covered during the laboratory session were: Use of survey instruments to locate contamination, counters, shielding technique, use of limited scintillation spectrometer, decontamination procedures and handling radioisotope shipments.

#### NOISE SYMPOSIUM OFFERS UPDATED INFORMATION

Two of our technical staff members attended a one day symposium sponsored by Ecological Controls, Inc., of Waltham.

A speaker from General Radio Company discussed all aspects of noise, from OSHA occupational limits to the mechanics of hearing and hearing loss. Of special interest was an outlined procedure for making a noise survey. The importance of audiometric records was stressed to employers for their future protection against hearing loss claims. Noise is increasingly being recognized as a serious health hazard.

A full line of all General Radios' latest equipment for noise measurement was demonstrated. Noise control materials such as, ear plugs and sound dampening materials, and sound dampening engineering were discussed by representatives of specialists in these fields.

It was a very informative seminar.





STATE EMPLOYEES COMPLAIN OF MYSTERIOUS MALADY

This Division was requested to investigate an employee complaint in a clerical office designated by the employer as a "sick room" in the McCormack Building. Three employees located there reportedly had constant symptoms of gastrointestinal pains, nausea, shortness of breath, and general tiredness since August, when one employee noted that the air conditioning unit in that room had been "adjusted". Extensive air samples for carbon monoxide, carbon dioxide, organic solvents, were obtained and subjected to chemical analysis. With the assistance of Mr. Robert Goldbaum, of the State Division of Food and Drugs, bacteriological samples of the air conditioning and heating units were taken. All efforts thus far have failed to clear up the mystery of the "sick room." The Division's Supervising Occupational Hygiene Nurse obtained medical histories of the three employees. These histories may indicate a common factor in the ailments of these co-workers.

FEDERAL AGENCY SPONSORS RADIATION COURSE

The Industrial Radiation Control Supervisor, sponsored by the Federal E.P.A. attended a one week course entitled, "Basic Radiation Protection". The course was given in the Department of Environmental Health Sciences of the Harvard School of Public Health. The course consisted of lectures supplemented by 2 hour laboratory exercises each day. The following facets of radiation protection were covered: atomic physics, radiation detection, biological effects, analysis and counting techniques, dosimetry, instrumentation, background radiation, shielding, waste disposal, USNRC and DOT regulation. Laboratory exercises embraced gamma spectroscopy, contamination detection, dosimetry, instrument calibration and shielding effectiveness.

The program was excellently organized and conducted. The tuition ~~was~~ sponsored by the New England Consortium on Environmental Protection.



### THE 56th MASSACHUSETTS SAFETY CONFERENCE

A staff member (senior engineer) of the Division was the program planner and chairperson for the Industrial Hygiene Session of this year's Massachusetts Safety Conference. The program was on the physiology of the lung and reaction to industrial contaminants. Attendees of the session were for the most part people working in industry with responsibilities for safety and health. The open floor discussion stressed the need of industry for competent specialist assistance in industrial health matters. Attendees responded favorably to the state consultation program.

### PLANNING FOR NUCLEAR EMERGENCIES

The Industrial Radiation Control Supervisor attended a one week course at the Harvard School of Public Health during the period May 16-20, 1977. The course was entitled "Planning for Nuclear Emergencies" and was designed to provide detailed coverage of all aspects of emergency planning for controlling population doses in the event of a large accidental release of radioactive materials from a nuclear power plant. The course included detailed review and discussion of the following subjects:

1. Sources of information and relevant publications
2. Instrumentation required.
3. Philosophy and current status of Emergency Planning.
4. Role of Defense Civil Preparedness Agency.
5. Liquid Pathway Studies.
6. Protective Guides.
7. Sabotage and Terrorism.
8. State Emergency Response Training.
9. Role of Meteorology in Emergency Planning.
10. Medical support requirements.
11. Accident scenarios.
12. Atmospheric Release Advisory Capability.



Lectures were conducted by nationally prominent persons in the field and included representatives from TVA, ERDA, Lawrence Livermore Laboratory, NRC, NY Bureau of Radiological Health, Brookhaven National Laboratory, EPA, Radiation Management Corporation, Commonwealth of Pennsylvania, Pacific Northwest Laboratory, Defense Civil Preparedness Agency, and Harvard School of Public Health.

The course was adjudged to be meaningful, timely, comprehensive and well conducted.

#### OVEREXPOSURE OF RADIOGRAPHY PERSONNEL

This Division recently cooperated with the U.S. Nuclear Regulatory Commission in the investigation of an overexposure incident involving two employees at a South Shore radiography company. Investigation disclosed that a Radiographer and his assistant had completed radiographing a large casting using a Cobalt 60 source. The cobalt 60 source was retracted into the shielded housing, however; the source tube was left attached and the source plug was not installed. The employees then proceeded to radiograph a smaller casting with a gamma projector using Iridium 192. After the required exposure time had elapsed, the Radiographer requested his assistant to crank in the Iridium source. The assistant mistakenly cranked out the Cobalt 60 source instead of cranking the Iridium 192 source in. This resulted in both sources being extended or in the exposed position. In setting up for the next Iridium shot in the vault, the Radiographer and his assistant were exposed to both sources in excess of occupational limits. Preliminary medical examinations showed that no harm was sustained by either employee.

Factors contributing to the overexposure accident were failure to make adequate survey before entering the vault where sources were exposed, failure of Radiographer to supervise his assistant, insufficient training of the assistant, failure to properly secure the cobalt 60 source after use, and use of a possible faulty survey meter.







A civil penalty is expected to be imposed on the Company by the Nuclear Regulatory Commission.

#### SPECIAL VENTILATION SEMINAR

Several staff members attended a seminar at Bolt, Beranek, and Newman Co., on "High Velocity - Low volume Ventilation Systems." This was a very informative discussion on the state of the art of highly efficient control systems applicable to power driven hand held dust generating tools. The initial costs of the ventilating equipment are rather high, but the efficiency is good and lower operating costs result from moving substantially less air. The seminar was presented by technical staff members of the Hoffman Company.

#### CHEMICAL SECTION

##### HEALTH HAZARD IN AN ELECTRICAL UTILITY MANHOLE

A telephone worker, suspicious of the water on the floor of a telephone equipment manhole, requested our Division investigate the situation. A sample of the water was brought to the laboratory, and an analysis performed by the Lawrence Experiment Station revealed that it contained a large number of coliform. Total coliform of 4300 per 100 ml, fecal coliform of 930/100 ml. These findings indicate definite sewerage contamination. A recommendation was made that the situation be thoroughly investigated by the Health Department of Boston. The source of the fecal contamination should be determined and corrective measures be instituted.

##### OZONE EXPOSURE AT A SEWAGE TREATMENT PLANT

The Division was requested to investigate a report that a worker was overcome by ozone gas in a MDC sewage plant. A study of the ozone handling procedures and the controls provided suggested that the cause of illness experienced by the worker in question was probably not due to ozone. Air samples taken for ozone in the sewage plant showed only small amounts of the gas in the working environment. Even under the most adverse conditions, enough ozone to produce illness could not be



produced with the present equipment.

#### INFRARED SPECTROPHOTOMETRY REPLACES X-RAY DIFFRACTION

The analysis of silica in foundry dust samples by infrared spectrophotometry was introduced in the laboratory this month. This will replace the analysis using the X-Ray Diffraction machine which will no longer operate and would cost \$35,000 to \$40,000 to replace.

#### BLOOD MONITORING AT THE MBTA ORANGE LINE

A biological monitoring program has been set up among the workers engaged in the abrasive blasting and painting of the MBTA Orange Line between Essex Street and Forest Hills.

Arrangements have been made between the contractor and a physician to collect blood samples on a regular basis. The blood analyses will be performed by this Division. This is the first instance where this Division has performed blood lead analyses for this operation. The results of the first analyses will help determine the frequency of the testing program.

The first set of tests indicates that no workers are being hazardedously exposed to lead. The levels ranged from 20-52 ug/100 ml. The normal range is 0-30 ug/100 ml.

#### CHEMISTS TAKE OVER NEW ADDITION

As soon as alterations were completed, the chemists moved into the new 1150 sq. ft. addition.

Part of the new area was used to expand the Instrument Room which had become overcrowded with the acquisition of new sophisticated instruments. A blood laboratory has been provided, as well as office and desk space for the chemical staff.

#### ISOCYANATE EXPOSURES IN AUTOBODY SHOPS

Two stage polyurethane paint systems are in common use in autobody shops that refinish and paint foreign made cars. These systems contain from 0.7% to 2% free



isocyanates, an amount that is clearly capable of producing symptoms of isocyanate poisoning. Such was the case in an autobody shop recently investigated where an employee reported symptoms of fever, chills, prolonged shortness of breath, after spray painting a small foreign made automobile.

#### PCB INVESTIGATION IN MASSACHUSETTS

Alerted by the U.S. Environmental Protection Agency and the State Department of Environmental Quality Engineering that a southeastern plant was contaminating the local river with polychlorinated biphenyls, our Division began a study of inplant worker exposure to determine the potential hazard and its control.

There are four plants in Massachusetts using PCB as an insulating material in capacitors and transformers. These plants will be included in the study.

The first plant surveyed uses the PCB material in capacitors. The capacitors are placed in holding tanks and the PCB is pumped into the tank and into the capacitor container. After a curing period of several hours, the filled capacitors are removed from the ventilated tanks. The openings in the capacitor holders are soldered.

Atmospheric tests using personal and general air samples revealed contamination well below the federal standard.

Similar air studies will be made at the other three plants.

#### BLONDE HAIR TURNS GREEN

A telephone call was received from a distraught father who reported that his daughter's light blonde hair was turning green. He and his family had recently moved into Massachusetts from South Carolina and now live in the town of Dover. The first tinge of green was noticed about 3 weeks after their arrival and it disappeared when she discontinued washing her hair at home. An analysis of the water which is supplied to her home through copper pipes from a well, revealed copper concentrations of 0.6 and 0.9 the higher concentration being found in the hot water supply. When she





returns to washing her hair at home (daily) the green tinge appears within three days.

The problem of copper in the water supply was further investigated in Boston. The Prudential Building Water supply contains from 0.01 to 1.8 PPM. Our own water in the laboratory and rest rooms contain up to 1.1 PPM.

Copper in large doses is toxic. According to published reports, concentrations in water ranging from 35 to 110 PPM can produce gastric upset and vomiting if enough liquid is consumed. However, concentrations found in the water samples mentioned earlier are not harmful. According to Public Health Drinking Water Standards, the permissible concentration of copper in drinking water is 3 PPM. But, because copper may impart an undesirable taste to drinking water, a concentration of 1 PPM is recommended as a limit.

#### NEW PROCESS REQUIRES SPECIAL CONTROLS

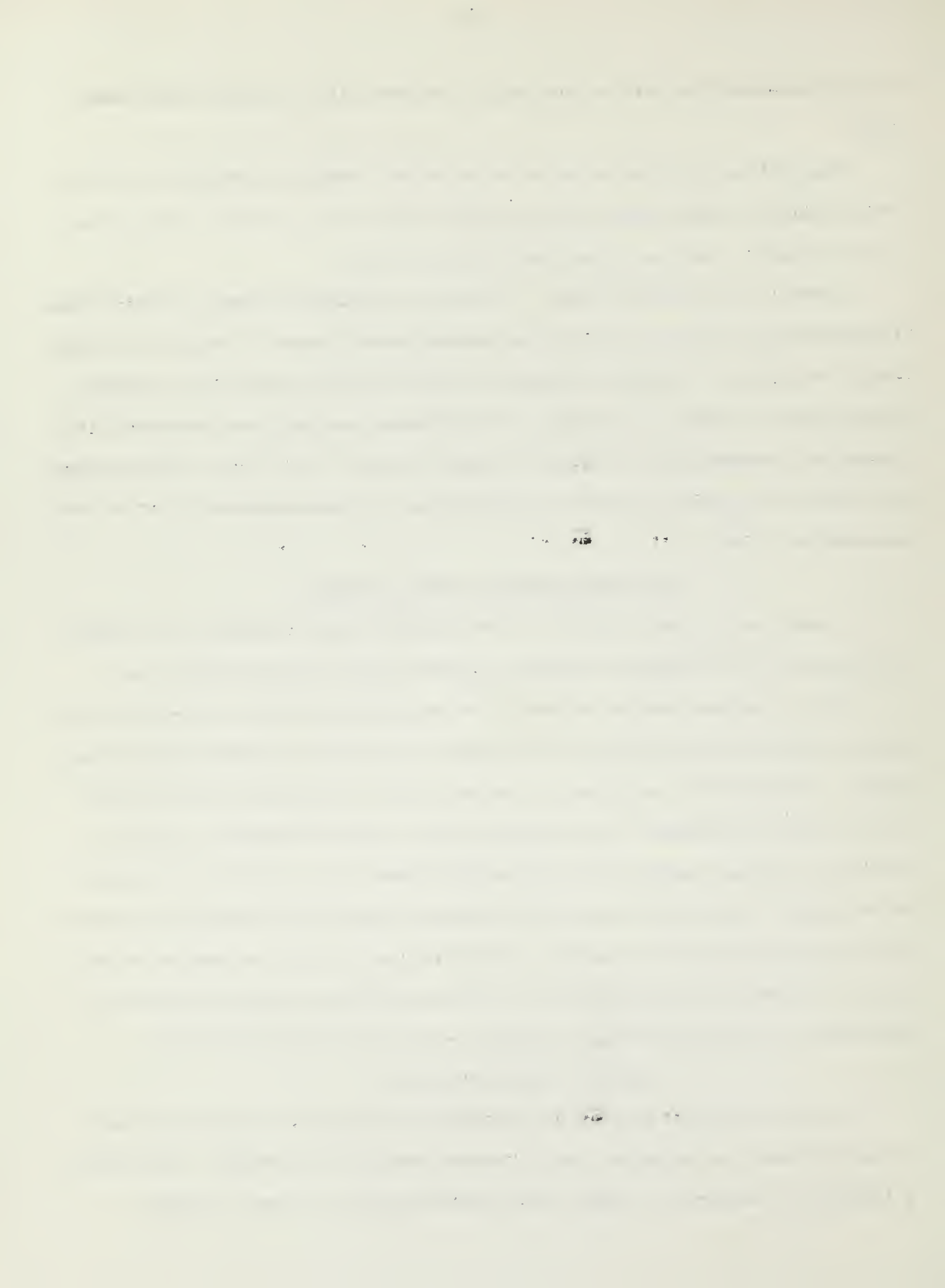
A visit was recently made to a gravure printing plant pursuant to the employer's request for an industrial hygiene evaluation of a new proprietary process.

The new process entails the coating of an opaque paper with ultra-violet sensitive acrylates and the exposing of the resin coated paper to intense ultra-violet light. The result is a translucent paper which will be fabricated into envelopes for the banking industries. The envelopes will be used for mutilated, spindled, and folded canceled checks and will allow these checks to be read by an automatic check reader. Without the transparent envelopes, these creased checks would have to be processed manually. The resulting evaluation revealed that the company is adequately protecting the employees from the dermatitis effects of the acrylates by a combination of personal protective equipment and local exhaust ventilation.

#### BENZENE EXPOSURE FOLLOW-UP

A paper on benzene exposure was presented by the Chief of Chemical Services at the 1977 American Industrial Health Conference held in New Orleans. It presents a follow-up of workers in a rubber coating plant who were exposed to benzene





concentrations as high as 140 ppm for periods of 24 years. Air analysis findings, the result of phenol excretions studies and blood tests performed between 1961 and 1965 were presented. Additional blood tests made in 1973, eight years after benzene exposure was terminated and the present health status of the 38 workers involved in the early study were discussed. It was concluded that definite signs of blood dyscrasia were present in many of the workers and one worker exhibited signs of overt benzene poisoning. Benzene exposures at 25 ppm would probably be safe for most workers, but the margin of safety is not too large. A threshold limit value of 10 is recommended. No signs of leukemia were reported in any of the workers studied. This finding is contrary to reports by NIOSH that benzene is a potent leukemic agent that has caused a reduction of the TLV for benzene to 1 ppm.

#### ALERT PROMPTS SPECIAL LEAD STUDY

A letter from the Center for Disease Control, Atlanta, Ga., to the Commissioner of Public Health advised that workers exposed to lead dust in various industries were bringing home contaminated work clothes and exposing other members of their families to the lead hazard.

#### HIGH VOLTAGE ARC CAUSES OZONE OVEREXPOSURE

Excessive ozone exposure was found in a plant where plastic film was treated with high voltage. The treatment is performed so that the surface of the film will accept a coating. Without the pretreatment which scrambles the molecules on the film, any attempt to apply any kind of coating including printing on a plastic surface will be unsuccessful. A by-product of this process is the production of ozone from the electric arc of the high voltage. Our tests showed that 4 of 8 tests taken for ozone were above the TLV. Recommendations were made to improve the ventilation supplied to the process.

#### N-NITROSAMINES IN THE WORKING ENVIRONMENT

At the June meeting of the New England Chapter of the American Industrial Hygiene Association, Dr. David H. Fine, senior scientist for the Thermo Electron



Research Center reported that N-nitrosamines are finding their way into many commercially important products. N-nitrosamines are highly carcinogenic chemical substances. In fact, 100 of the 400 known carcinogens are said to be nitrosamines. Dr. Fine's company has developed a highly sensitive single purpose, sophisticated, expensive detection system which revealed that synthetic cutting oils, some pesticides and herbicides, rocket fuels, and cosmetics contain significant amounts of this carcinogen. Three cases of eye cancer were reported in a community of West Virginia where rocket fuels are manufactured. It results primarily from reactions with constituents of the products and is not a substance added to any formulation. Epidemiological studies are now in progress to determine the full significance of these findings on the general health of workers exposed to these substances.

#### MEDICAL SECTION

##### FORGINGS PLANT COOPERATES IN EPIDEMIOLOGICAL STUDY

As part of the company's ongoing preventive health program, a review of available death records was initiated in an effort to identify potential health problems. A possible excess in mortality from malignancies was noted and an expert was asked to complete a preliminary analysis of the mortality data. His proportional mortality study indicated that an excess in cancer mortality appeared to exist.

The greatest increases were seen for cancer of the lung, lymphatic/hematopoietic cancers and cancer of the pancreas. The excess mortality from cancer of the lung and lymphatic/hematopoietic cancers appears to be statistically significant.

There is no evidence of a causal relationship between employment and any death. However, recent studies elsewhere suggest that exposure to volatilized lubricating oils may be significant with respect to lung cancer. Also, in the past, asbestos blankets were used in the forge shops and may also be a factor in the increased lung cancers.



The use of asbestos blankets was discontinued in late 1972. The reason, or reasons, for the excess lymphatic/hematopoietic cancers remain unknown. An effort to discover past contact with organic solvents has so far failed to reveal significant exposure.

Past and present action has been taken to improve in-plant air quality. Anti-cigarette smoking campaigns have been a constant Medical Department effort. A method of monitoring current deaths has been developed. An in-depth industrial hygiene survey of both plants has begun.

In addition, a proportional mortality study of employees who died before 1966 is underway. A periodic health screening program to include indicated pulmonary and hematologic studies will be started at the earliest possible date.

Such action on the part of a company is to be commended. We hope this serves as a model for the rest of Massachusetts industry.

#### INDUSTRIAL NURSES RECEIVE TOXICOLOGY LECTURE

The Chief of Chemical Services presented a three hour talk on industrial hygiene and toxicology to nurses attending the conference held at the Sheraton Boston Hotel by the American Association of Occupational Health Nurses. The talk stressed specific chemicals which are commonly encountered in the work environment. It included a discussion of sources of toxicological information, air sampling techniques, a biological monitoring in addition to the toxicological review of specific chemicals. The talk was attended by 63 nurses.

#### DOH EASES PLANT'S BURDEN

An eastern Massachusetts plant engaged in the manufacture of





electric heating units was cited by OSHA for not providing medical surveillance for employees exposed to a minimal (10% of the federal standard) asbestos hazard. Plant management contested the citation and appealed to this Division for the provision of pulmonary function tests for their potentially exposed workers.

The Occupational Hygiene Physician provided pulmonary function tests and completed a medical questionnaire for dermatitis related to asbestos exposure.

In general, the results (25 employees), were as expected with only a few employees showing reduced or abnormal test results which did not appear to be related to the asbestos exposures.

#### DOH AND NIOSH IN COOPERATIVE STUDY

A high incidence of cancer was reported to the National Institute for Occupational Safety and Health by a rubber products manufacturer located in Massachusetts.

This report prompted a visit by the NIOSH scientists who performed a joint survey with our Chief of Chemical Services. Future plans will include a more complete epidemiological study.

#### MASSACHUSETTS PLANT VOLUNTEERS CANCER STUDY INFORMATION

A large national rubber products manufacturing company with a plant located in eastern Massachusetts submitted morbidity and mortality statistics to the U.S. National Institute for Occupational Safety and Health which showed above the national expectancy for industrial cancers among their employees of the Massachusetts plant. Arrangements have been concluded for our staff members to meet with the company



management and NIOSH officials to discuss the findings and survey the suspected cancer causing operations in the near future.

The Division technical staff has made many visits to this plant during the past 30 years at the request of management or the employees on special problems but a complete detailed study of all operations has never been accomplished. The contemplated survey will permit a more comprehensive study.

NERVE CONDUCTION STUDIES EVALUATE SOLVENT  
EXPOSURES

Nerve conduction studies were performed on nineteen workers employed on a construction project. The purpose of the studies was to evaluate the possible effects of exposure to paint with Methyl butyl ketone (MBK) as a solvent. The study was done in association with blood lead levels to control in-nerve disease which might be associated only with lead. The tests were performed with the assistance of Dr. Lawrence Fine and Dr. Robert Feldman's group from B.U. Medical School. The cost of the tests were borne by the Harvard School of Public Health through Dr. Fine.

The results were quite equivocal. The evaluations were performed using a combined score index for the several motor and sensory nerves test. The findings showed:

- (a) Functional abnormalities without symptoms in a high proportion of painters.
- (b) It does not appear that the proportion of abnormalities is higher in those exposed to MBK than those minimally or not exposed to MBK. The exposure to pure MBK is so small as to notice the results of the tests non-determinative in this respect.



- (c) There is no clear relationship to duration of exposure on this job.

It would appear that construction painters probably suffer more asymptomatic and possibly symptomatic neurologic disease when compared to a normal or unexposed population. If possible, it could be desirable to focus a study on painters in general evaluating, in particular, those who have been employed for a long time and have done mostly the same kind of painting.

#### NEW METHOD TO DETECT OCCUPATIONAL DISEASE

A new technique has been introduced into DOH evaluation of occupational disease hazards in the Commonwealth. The proportional mortality analysis allows the use of death certificates alone to identify workplaces where special risks of occupational disease, especially cancer, may exist. Using this technique in a plant in central Massachusetts, a possible new cancer hazard has been identified. With the full cooperation of the company involved, the investigation is proceeding to determine whether this possibility can be confirmed and if so, to identify the cause.

#### COMMONWEALTH CANCER MORTALITY STUDY

The concern with cancer mortality patterns in the U.S. has significantly increased recently with the publication of the National Cancer Institute's Cancer by County, 1950-1969, Atlas. This prompted an attempt to evaluate cancer risk in the Commonwealth as it relates to occupation. Three years ago a study was initiated with the cooperation of the Department of Public Health and the Harvard School of Public Health. Thirty-seven thousand male death records (one half of which are



cancer) 'are being reviewed for occupation and employer. This data, after three years, is now ready for final analysis. The plan will be to compare occupational patterns in specific types of cancer to the general population pattern to identify those which are over-represented. It is expected that initial analysis of these data will be completed within the next six months.

#### ETHICS IN OCCUPATIONAL MEDICINE

The New York Academy of Medicine held a two-day symposium June 21, and 22, on Ethical Issues in Occupational Medicine. Dr. Wegman attended the meeting to present a paper on the Duty to Report Hazards - A Public Health Perspective. The presentation focused on the necessity to identify and report all potential hazards to workers and appropriate agencies. Furthermore, he emphasized the need to look for new, unsuspected work related illnesses by systematic data gathering and analysis. He added that education of the potentially harmed workers was necessary to inform them adequately and to gain their cooperation in controlling hazardous exposures.





NURSING SECTION

NURSING ACTIVITIES - JULY

Two hospitals requested conferences to establish employee health services.

A graduation speech was given to the nurses who completed the Occupational Health Nurse practitioners Course sponsored by Boston University School of Nursing. Another nurse practitioner course will be offered in January.

The health service for employees at the McCormack Building will be starting August 16. Nurses were interviewed for the job. A job description was written for Civil Service.

Preparation has been started for a two-day workshop to be presented to the annual national meeting of the Occupational Medical and Industrial Nurses Association which will be held in Boston, April, 1977.

NURSING ACTIVITIES - AUGUST

Five nurses were interviewed for the position of Supervising Nurse at the Government Center. A nurse has been employed, and will start at the McCormack Building on September 7.

The Supervising Occupational Hygiene Nurse assisted three nurses with the basic procedures of occupational health. These nurses have had no previous industrial nursing experience. The service was requested by management.

A meeting was held with representatives of NIOSH and the administrator of the Somerville Hospital. The purpose of the meeting was to try to convince the hospital authorities that they should become involved in occupational health programs for the industries in their community. Future meetings are anticipated.

Plans are progressing for another Occupational Nurse Practitioner Course at B.U. School of Nursing. This program will be available in January, 1977. Unless granted, the cost will be \$1000 per student.



NURSING ACTIVITIES - SEPTEMBER

The Occupational Hygiene Nurse completed the Standard Instructor Course given in first aid by the American Red Cross.

A lecture was given on occupational health to the Massachusetts Council of Visiting Nurses Board members in Framingham.

A meeting was held with the educators of Mt. Auburn School of Nursing outlining a course in occupational health for their senior student nurses.

Two meetings were held with visiting directors relative to developing services for industry.

Two nurses were interviewed for the McCormack building clinic.

NURSING ACTIVITIES - OCTOBER

Four lectures were given on occupational nursing.

The supervising occupational hygiene nurse assisted the Massachusetts Department of Public Health with the flu inoculating program at the Saltonstall State Office Building. There were approximately 2,500 State employees who participated.

A meeting was held with representatives of New Hampshire who wish to establish (actually re-establish) an occupational health nurse position at the state level.

Twenty-seven students from Mt. Auburn School of Nursing were placed for one day occupational health experience in diversified occupational health medical units.

NURSING ACTIVITIES - NOVEMBER

A meeting was held with the Government Center nurses, capitol police, and a representative of the Department of Administration and Finance relative to uniformity of procedure (medical), accident reporting, and communications.

A two-day seminar, sponsored by the Massachusetts Department of Public Health, Region I, developed by Health Dynamics, Inc., was attended. The program was on Ambulatory Care. The Supervising Occupational Hygiene Nurse was the recorder for



the Occupational Health and College Health Nursing groups during the two-day session.

A lecture was given to the South Shore Dental Hygiene Association.

#### NURSING ACTIVITIES - DECEMBER

Three visits were made to one plant to assist a nurse, new to occupational health, with procedure and record keeping.

A requested visit was made to Portsmouth, New Hampshire to assist the Community Health Service with a B/P screening program for industries in New Hampshire. This program has received a grant from H.E.W.

#### NURSING ACTIVITIES - JANUARY

Visits were made to two companies which have recently employed nurses who have not had nursing services previously.

A return visit was made to a municipal hospital which had adopted previous recommendations for an employee health service.

Nineteen telephone investigation calls, relative to minor occupational health problems, were made. These were claims submitted to the Industrial Accident Board. Three visits were made to plants relative to dermatitis problems.

A visit was made to the Merrimack Health Council relative to the need for occupational health services in the Merrimack Valley.

The Department of H.E.W. recently appointed a nurse to develop occupational health programs which will be presented by the various colleges for continuing education in nursing. The occupational hygiene nurse was asked to assist with the planning

#### NURSING ACTIVITIES - FEBRUARY

The occupational hygiene nurse was invited to participate in two safety committee meetings. The films on safety were obtained from the library at the Division of

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## Industrial Safety.

A masters program in occupational health is being developed at Boston University. The occupational hygiene nurse participated in formulating the program.

A dermatitis problem was investigated. The causative agent has been discontinued in the manufacturing process.

### NURSING ACTIVITIES - MARCH

A meeting and lecture was held with the Merrimac Valley Planning Council to outline the occupational health needs in that region.

Two occupational health lectures were given to senior student nursing groups. Boston College and Mt. Auburn.

One lecture was given to the audiometric technician class at the Boston Guild for Hard of Hearing.

### NURSING ACTIVITIES - APRIL

There were eight plant visits made during the month of April, and 48 recommendations were submitted.

The occupational hygiene nurse gave the commencement address to the graduating class of Mount Auburn Hospital.

A two-day workshop for the national conference of the American Association of the Occupational Health Nurses was chaired and conducted by the occupational hygiene nurse. A complete set of Recommended Safe Practice Bulletins were distributed to the 65 participants. These bulletins were used as the text for the course.

The occupational hygiene nurse participated in several seminars at the conference.

A lecture on occupational hygiene and health was given to the Taunton Chamber of Commerce. Twenty-six members were present.



A lecture was given to the occupational health nurses in New Hampshire at the New Hampshire Safety Conference.

A meeting was held with the executive director and staff of the March of Dimes relative to a national program on toxic substance found in the work environment and the relationship to birth defects is being developed.

#### NURSING ACTIVITIES - MAY

The occupational hygiene nurse was invited to attend a three day workshop in Cincinnati (NIOSH) and to present a paper on "Educating the Small and Medium Size Employees and Workers on Environmental Hazards Found in the Work Place."

There were ten visits made to industries.

Two companies invited the nurse to participate in their safety program.

One lecture was given to the group of Occupational Health Nurse Practitioners who have completed their course at Boston University.

One investigation was completed for the Department of Public Welfare, Billerica.

#### NURSING ACTIVITIES - JUNE

There were 23 visits made during this period. There were 91 recommendations submitted. Eleven previously submitted recommendations have been accepted.

Interviews were held with two newly appointed medical directors.

A conference was held with the instructors at Mt. Auburn School of Nursing to formulate an occupational health course for the student nurses.

A request from the Harvard School of Public Health to discuss with representatives from NIOSH the need for formal educational programs for current and future nurses in the occupational health specialty was held. The purpose of the request was to assist the school with the grant application review for future courses in occupational health for physicians, nurses and industrial hygiene personnel.



ADMINISTRATIVE SECTION

TRAINING PROGRAMS CONSULTANTS AIDED

Two consultants of a local social reforms organization with a 16 month contract from OSHA visited the D.O.H. and discussed their problems with the Director and Chief of Chemical Services of the Division, and the industrial training supervisor of the Division of Industrial Safety

The contract is for the development and pilot testing of training programs for employees exposed to chemical carcinogens. Packaged information consisting of hand-outs, signs, tapes and slides will be developed and included in the training programs. Industrial plant management will be interviewed in the development process. The consultants will visit the Training Section facilities of the Division of Industrial Safety, and will request hazard information on the chemical carcinogens used in Massachusetts.

STAFF MEETING DISCUSSES PRESENT DOH PROGRAMS

A meeting was held with the technical staff members of the Division to discuss (a) MBTA refurbishing program- a progress report: (b) Present biological analyses program of DOH and laboratory quality control; (c) Present status of the 7 (c) (1) Program: (d) Official discipline procedures: (e) Private and Public Information Act.

JAPANESE REPORTER VISITS DEPARTMENT

Mr. Yoshiyuki Emoto, a Japanese free-lance labor reporter, accompanied by an English-speaking Japanese interpreter met with Commissioner N. Roussos and the Director of Occupational Hygiene to discuss labor programs and problems in Massachusetts. Commissioner Roussos discussed the organization of labor unions, the state Board of Conciliation and Arbitration, and reviewed the protocol in labor disputes. The Director of Occupational Hygiene discussed the occupational health services provided by this Division.





#### INTERNSHIP OFFICE RECEIVES DOH ORIENTATION

A student intern representing the Massachusetts internship Office, Executive Office of State Education, visited the DOH to discuss our organization and functions relative to future interns being assigned for on-the-job training. The methods of intern training used by this Division were reviewed in detail. The intern was given a tour of the premises and viewed the chemical staff operating some of our sophisticated electronic equipment.

#### END OF YEAR STAFF MEETING

The traditional "End of Year Staff Meeting" provided an opportunity for the Director and the technical staff to discuss accomplishments, special investigations, and goals for the coming year.

The Director discussed administrative problems, the budget for 1977 and 1978, and the Annual Report of 1976.

The PCB Problem in Massachusetts was discussed by the Chief of Chemical Services. The findings of the microwave oven study for a vending service company with ovens in several industrial plants were discussed by the Senior Engineer. One of the Health Consultants presented an update of the OSHA sponsored NEP Foundry Program.

#### OSHA MEETING ON NEP FOUNDRY PROGRAM

The Directors of Occupational Hygiene and Industrial Safety with their health and safety coordinators attended a meeting with the OSHA representatives to discuss the details and procedures for getting the foundry survey program survey.

#### MASSACHUSETTS ASBESTOS COMMISSION FILES FIRST REPORT

The first interim report of the Legislative Special Commission on Asbestos, chaired by Representative Lois Pines, of Newton, was filed with the clerk of the Massachusetts House of Representatives. The Commission was appointed to evaluate the extent of asbestos as fireproofing and insulation in the schools and public





buildings within the Commonwealth. The report reviewed the legislative order creating the Commission, membership of the Commission (the Director of Occupational Hygiene is a designated member) the present problems, and the health effects of asbestos inhalation.

Simultaneously, a New Jersey newspaper headline revealed that a physician in that state had linked a student's respiratory illness with the inhalation of asbestos in a school attended by his patient.

Subsequent newspaper publicity resulted in a demand for the shut-down of a group of schools until a survey had established the safety of the school children.

#### STUDENT URGES CONTINUANCE OF INTERN PROGRAM

The Division's first six month student intern wrote the following letter to the Director on completion of her internship.

"I have been involved with the Division of Occupational Hygiene since June, (my Summer and Fall school terms), as a full-time student intern during the summer, part-time since then.

The Division of Occupational Hygiene and all its staff members have provided me with the opportunity to participate in many aspects of the Division's work in the field of occupational health and hygiene. I have gone on plant visits, made engineering and medical consultations, done environmental monitoring, and analyzed different biological and environmental samples with DOH personnel. I have also been involved with occupational health research.

Before I worked with the Division of Occupational Hygiene, I was interested in this field, but unsure of which aspect I wanted to concentrate on. This experience has allowed me to try various approaches, and I have become primarily interested in doing occupational medical research.

Fall Semester is over, and so is my time with the Division. My plans now include continuing to work in the occupational health field, doing research and



working with Dr. Wegman in the Harvard School of Public Health Occupational Health Program and graduating from school in June.

I want to take this opportunity to thank you and everyone at the Division of Occupational Hygiene for giving me this invaluable opportunity to work with and learn from you all, and for making it such an exciting, educational, and most pleasant experience. It has been so worthwhile for me that I would like to express the hope that the Division continued to permit other students to do internships there and thereby benefit similarly.

#### PUBLIC HEARING ON H2705

Several members of the Department of Labor & Industries, including the Commissioner and the Directors of Industrial Safety and Occupational Hygiene testified at the public hearing in favor of H2705, "An Act Providing for a Program of Occupational Safety and Health and For the Prevention of Industrial Accidents to Public Employees." Members of several labor organizations testified in favor of the bill. There was no opposition to H2705 at this hearing.

#### RADIATION PROTECTION PERSONNEL STUDY

A graduate student in the Department of Radiological Sciences, University of Lowell, in the preparation of her graduate thesis, requested permission to review the Division files on registrants of ionizing radiation sources used by Massachusetts industries. An indepth manpower study of radiation protection personnel was developed from approximately 750 industrial registrants. A list of the present radiation protection personnel was compiled by the graduate student. A copy of the study was presented to this Division for future use.

#### NOISE SYMPOSIUM OFFERS UPDATED INFORMATION

Two of our technical staff members attended a one day symposium sponsored by Ecological Controls, Inc., of Waltham.

A speaker from General Radio Company discussed all aspects of noise, from OSHA



occupational limits to the mechanics of hearing and hearing loss. Of special interest was an outlined procedure for making a noise survey. The importance of audiometric records was stressed to employers for their future protection against hearing loss claims. Noise is increasingly being recognized as a serious health hazard.

A full line of all General Radios' latest equipment for noise measurement was demonstrated. Noise control materials such as, ear plugs and sound dampening materials, and sound dampening engineering were discussed by representatives of specialists in these fields.

It was a very informative seminar.

#### DOH OFFERS TRAINING FOR INDUSTRIAL INSPECTORS

In a recent visit to our expanded facility, the Director of the Division of Industrial Safety, and the Director of this Division discussed the future training program for inspectors of D.I.S.

The DOH training capabilities were reviewed. It was agreed that three industrial inspectors, who have recently been subjected to an intensive 8 weeks training course in industrial hygiene at the Wichita State University, Wichita, Kansas, will be given additional training by the DOH staff in the chemical, medical, engineering, and nursing aspects of occupational health.

After an indefinite training period, each inspector will be assigned special industrial hygiene surveys to evaluate the training program.

#### CONTINUATION OF ASBESTOS COMMISSION

The Chief of Chemical Services, representing the Director, participated at a hearing on the extension of the Commission on Asbestos held at the State House. The Commission was established to study asbestos exposures in schools in the Commonwealth built between 1965 to 1972, when asbestos was freely used to cover exposed





steel beams. Preliminary surveys by the Division have shown significant levels of asbestos fibers in the air of these schools. The alarming factor is that over the years asbestos contamination will increase because of deterioration and flaking of the material. Asbestos is toxic and capable of producing lung cancer. Recommendations for controlling this potential hazard were made.

#### COMPTROLLER MEETS WITH FISCAL DIRECTORS

The statewide meeting of the Fiscal Directors and their assistants held on May 27, at the Massachusetts Bay Community College in Wellesley afforded the opportunity to hear some of the key people in the Comptroller's Division tell about their role in that agency and how it is of significant importance in the management of the Commonwealth.



SOURCES OF INQUIRY

<u>Source</u>	<u>Services</u>	<u>Information</u>	<u>Total</u>
Division of Industrial Safety	43	10	53
Follow-up	40	-	40
Radiation Surveys	63	-	63
Self-Initiated	96	-	96
Employer	92	188	279
Labor Union - Employee	57	24	81
Government	34	40	74
Physicians-Hospitals	37	24	61
Dentists	13	-	13
Nurse <del>Therapist</del>	-	6	6
Consultants	2	27	29
Research	3	5	6
Schools	19	27	46
Professional Organization	3	6	9
Non-Prof. Organization	3	28	31
Insurance	15	8	23
Non-Official Agency	4	-	4
Attorneys	3	10	11
OSHA	2	1	3
Publisher	-	9	9
Industrial Accident Board	4	-	4
Libraries	3	7	10
Tenants, Citizens, etc.	7	20	27
	<u>538</u>	<u>440</u>	<u>978</u>
Out of State Requests		42	42



FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONS

HARMFUL SUBSTANCES AND CONDITIONS

Acetone	4	Copper	7
Aldehydes, NOC	2	Cotton	1
Aluminum	4	Cresol	2
Amines	1	Cyanide	3
Ammonia	9	Cyclohexanone	2
Amyl Acetate	3	Dermatitis	2
Anthrax	1	Diethyl Benzene	1
Arsenic	1	Dimethyl Formamide	5
Asbestos	28	Dioxane	2
Asphalt	1	Dust, NOC	48
Benzene	2	Epoxy Resins	3
Beryllium	2	Ethyl Acetate	1
Butyl Acetate	2	Ethyl Cellosolve	1
Butyl Cellosolve	2	Ethylene Dichloride	1
Cadmium	7	Ethylene Glycol	1
Cancer	1	Fluorides	3
Carbon Dioxide	7	Formaldehyde	8
Carbon Dust	4	Freon	2
Carbon Monoxide	83	Furan	1
Cellosolve Acetate	4	Gold	1
Chlorine	4	Heat Stress	3
Chloroform	3	Hexane	2
Chromate	1		
Chromium	1		
Cobalt	1		









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# The Commonwealth of Massachusetts

MICHAEL S. DUKAKIS, *Governor*

Executive Office of Manpower Affairs  
Howard N. Smith, *Secretary*

DEPARTMENT OF LABOR AND INDUSTRIES

NICHOLAS ROUSSOS, *Commissioner*

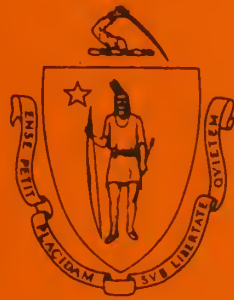
DIVISION OF OCCUPATIONAL HYGIENE

HAROLD BAVLEY, P.E., *Director*

U OF MASS - BOSTON

PREVENTION

DETECTION



EVALUATION

CONTROL

# ANNUAL REPORT 1978

Originating Office



Department of Labor and Industries, Division of Occupational Hygiene

39 Boylston Street, Boston, Massachusetts 02116



ANNUAL REPORT  
OF THE  
DIVISION OF OCCUPATIONAL HYGIENE  
FISCAL YEAR 1978

This Annual Report records the program and activities of the Division of Occupational Hygiene of the Department of Labor and Industries for the fiscal year beginning July 1, 1977, and ending June 30, 1978.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentary Edition, "An ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES.

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Harold Bavley, B.S., P.E., Director  
Leonard D. Pagnotto, M.S., Assistant Director  
David H. Wegman, M.D., Occupational Hygiene Physician  
Frederick L. Schultz, B.S. Chief of Laboratory  
Rexford G. Alexander, M.S., Senior Industrial Sanitary Engineer  
Frank R. Archibald, B.S., P.E., Industrial Radiation Control Supervisor  
Jack Yee, B.S., Senior Industrial Sanitary Engineer  
Max Richmond, B.S., Senior Chemist  
Henry L. Smith, B.S., Senior Chemist  
Anne Ackerman, R.H., Supervising Occupational Hygiene Nurse  
Thomas J. Vegella, B.S., Assistant Industrial Hygiene Engineer

Publication No. 11266

Approved by Alfred C. Holland, State Purchasing Agent



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 Mary S. Chin-Lim, Senior Clerk-Typist

Anita Seroll, H.S. Assistant Industrial Hygiene Engineer - Asbestos Commission  
 Karen Irving, H.S., Assistant Chemist - Asbestos Commission  
 Todd Merrill, B.S., Assistant Chemist - Asbestos Commission

The following personnel changes occurred during Fiscal 1978:

Leonard D. Pagnotto, H.S., was promoted to Assistant Director during April, 1978.

Jack Yee, B.S., who supervised the activities of the Engineering Section, resigned on May 15, 1978, to take a position with Arthur D. Little Co., Cambridge, as an industrial hygiene engineer.

Rexford G. Alexander, H.S., replaced Jack Yee as Supervisor of the Engineering Section and of the staff hired to perform the mandated investigation of the use of asbestos sprayed-on fireproofing in public schools and public buildings.

Thomas J. Vegello went on educational leave to obtain a master's degree in industrial hygiene. He resigned on May 31, 1978, to take a position with the U.S. Public Health Service.

Erwin Allen was promoted to Assistant Industrial Hygiene Engineer and remained as a Health Consultant with the federally sponsored 7(c)(1) On-Site Consultation Program.

Louise H. Lydon retired from State Service on July 30, 1977. She was replaced by Mary S. Chin-Lim who was promoted to Senior Library Assistant during August, 1977. Linda Tremblay was promoted to Assistant Chemist. The Junior Chemist position was filled by Elaine Krueger, H.S.

Joan H. Bando was hired to fill the position of Senior Clerk-Typist on November 13, 1977.

Anita Seroll resigned on June 18, 1978, from her position as Assistant Industrial Hygiene Engineer to take a position with the U.S. Department of Labor, OSHA, as a





Compliance Officer - Industrial Hygienist.

Anne Ackerman, Supervising Occupational Hygiene Nurse retired in December, 1977, to start her own business offering occupational nursing to industry. She was replaced on April 9, 1978, by Theresa M. Murphy M.S., R.N., who was formerly employed by industry and the federal government.

Ellen J. Newlands, B.S., formerly with the Massachusetts Department of Environmental Quality Engineering was hired as an Assistant Chemist to work on the Asbestos Commission's project.

Kathleen O'Brien, a sophomore at Boston College was hired as a summer intern to obtain training in the various disciplines of industrial hygiene and occupational health.

The Division of Occupational Hygiene in the Department of Labor and Industries is an official advisory agency of the Commonwealth of Massachusetts established by the legislature in 1934, to investigate conditions of occupation with reference to hazards to health. The Division assists employers, labor, state and local agencies, and all individuals concerned with the prevention of industrial health problems.

The Division is divided administratively into an Engineering Section, a Chemical Section including a laboratory, a Medical and Nursing Section, and an Information Section.

#### GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston. The Division laboratory was refurbished with new bench tops and a new laboratory fume hood.

A total of 1009 services were undertaken, 388 in-state requests, 43 out-of-state requests for information on matters pertaining to occupational health were answered. These services required a total of 1092 plant visits, 277 visits to other agencies, and 29 talks and lectures by the Division staff. This is an increase of approximately 10% for plant visits and an increase of 11% for other field visits.



Field studies involved 3526 measurements of environmental conditions and the collection and analysis of 1063 chemical and 640 dust air samples in places of employment. In addition, the laboratory evaluations included the analysis of 1874 urine samples, and 392 material samples, 1609 blood samples, 10 breath samples, and 5 smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U.S. Department of Health Education and Welfare, and analyzed 112 simulated air samples for asbestos, lead, cadmium, zinc and solvents.

The plant studies and visits resulted in more than 1971 recommendations (10.8% increase over 1977) potentially affecting more than 40,500 workers. Follow-up visits revealed the completion of 36 recommendations affecting approximately 4310 workers.

The Massachusetts Department of Labor and Industries continued the 7(c)(1) On-Site Consultation Program sponsored by the U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) which provides on-site consultations in health and safety matters at the employers' requests. Under this contract, two staff members (two engineers) of this Division provided this service to industries. The program was designed to encourage voluntary compliance. The Health Consultants after the plant or hazard survey for the evaluation of the potential health hazards provided the employers with a list of apparent OSHA violations and submitted recommendations for the corrections of the deficiencies encountered at the time of the on-site consultation visit.

The 7 (c)(1) On-Site Consultation Program was funded on a 90%-10% reimbursable cost basis. Approximately 163 consultative visits were completed during Fiscal 1977. The second year of the contract involved two weeks of training of the Health Consultants by staff members of the University of Alabama, Tuscaloosa, Alabama, in various aspects and methods of investigation of plant hazards.



The investigation of non-ferrous and ferrous foundries in Massachusetts continued in accordance with the National Emphasis Program. To date approximately ninety (90) foundries out of approximately ninety-eight (98) foundries have been surveyed in conjunction with the Safety Consultants of the Division of Industrial Safety as mandated under the special foundry program as part of the 7(c)(1) On-Site Consultation Program.

#### ASBESTOS EXPOSURE IN MASSACHUSETTS PUBLIC SCHOOLS

Epidemiologic studies have established an association between mesothelioma and inhalation of asbestos fibers among people with no history of occupational exposure to asbestos. The use of spray-on asbestos-containing materials by the construction industry was widespread from the early 1940's until controls were promulgated by the EPA in 1973. In 1975, a Massachusetts legislative commission was established by the governor to investigate the potential health hazards associated with the use of sprayed-on asbestos in public school buildings. Every school built, renovated, or added onto (over 1400) during the time period from 1946 to 1973, was evaluated by a safety inspector during a walk-through survey. Bulk samples of all sprayed-on materials in the public areas of these schools were collected and analyzed for asbestos content. Qualitative and quantitative bulk sample testing involved the appropriate combination of at least two of the following analytical techniques: (1) phase contrast microscopy, (2) infrared spectrophotometry, (3) electron microscopy with selected area electron diffraction, and (4) microscopical dispersion staining. Only those schools with asbestos-containing materials were air sampled. Airborne concentrations of asbestos fibers were determined in accordance with NIOSH procedures. The Asbestos Commission has determined that daily public exposures under 0.04 fibers/cc of air are of minimal concern. This background level was based on fiber levels derived from a sampling survey of schools containing no asbestos. None of the collected air samples was significantly greater than this level. A rating system was devised and implemented which generated a single number





(Ferris Index) for each school. This number reflected the degree of potential health hazard associated with the asbestos sprayed-on material. The Ferris Index incorporated data from five parameters. Four of the five parameters were evaluated numerically on two different occasions; by safety inspectors during the initial walk-through survey and by the Asbestos Commission staff during the air sampling phase. The numbers assigned to the following parameters were added together: (1) accessibility, (2) condition, (3) friability, and (4) presence in an air plenum. This sum was multiplied by the value given to the variable, (5) percentage of asbestos. The degree of hazard established by the Ferris Index was the basis for recommendations for future action. This comprehensive study revealed that while sprayed-on materials containing asbestos are present in 13 percent of the surveyed schools, only three percent of the schools had Ferris Indices high enough to warrant selection of one or more of the following long-term controls: (1) removal, (2) enclosure, and (3) encapsulation. Control recommendations were based on a multiplicity of structural and environmental factors. The Commission staff notified all the school superintendents, school board chairpersons, and state legislators of the Commission's findings and recommendations for the schools within their jurisdiction. The Asbestos Commission appointed an ad hoc committee to study the economic impact of the asbestos controls on the state and local communities. Availability of alternate sources of funds to assist these affected communities has been explored. The investigation revealed that only a small percentage of the schools required immediate action to abate the potential health hazards from asbestos found in their buildings.

By the end of Fiscal 1978, walk-through surveys were completed in 846 public schools; 539 have yet to be surveyed. Sprayed-on coatings were found to be present in approximately 175 schools and over 90 of these sprayed-on materials have been positively identified as asbestos. Seventy-nine schools have been air sampled involving a total of 323 air samples to date.





The Asbestos Commission expects that the major aspects of the program with regards to sampling in public schools will be completed during the next year. The continuation of the program this year includes efforts in the following areas of concern:

1. Completion of the initial walk-through surveys of the public schools by inspectors of the Division of Industrial Safety.
2. Analysis of the bulk samples of school sprayed-on materials gathered by the inspectors during the walk-through surveys.
3. Air sampling of those schools where asbestos is present. This air sampling is to be performed by the Commission staff.
4. Reports will be sent to each school containing the results of the asbestos survey with the conclusions by the Asbestos Commission.
5. A reinspection of certain schools will be performed for the purpose of determining control recommendations appropriate for the school. The projection from current data is that 75 schools will receive this reinspection.
6. Analysis of the bulk samples from boiler rooms and pipe lagging, which is a part of the buildings, but not a part of the public areas.
7. Initiate a program for the re-evaluation of schools where the initial evaluation has resulted in the recommendation that the hazard from asbestos be periodically assessed.

The Commission mandate is to evaluate asbestos in both schools and public buildings. The technical evaluation of the schools will be completed in accordance with the above outline. Since the Asbestos Commission was established, several requests from the occupants have been received to inspect various public buildings. At this time, the Commission program will be modified as needed to start an organized comprehensive evaluation of the potential asbestos hazard in public buildings.

Corrective action to reduce the asbestos will require construction activity at



a number of schools. The work may be done by members of the school maintenance staff or by outside contractors. In either case, experience has shown that such work must be strictly monitored to ensure that appropriate controls are instituted, or the school will become severely contaminated with asbestos.

At present, construction is underway at one school in the state and the Commission is monitoring the work to prevent asbestos contamination. However, if the future brings a marked increase in the number of such construction jobs, the demand for monitoring will overwhelm the manpower available for such projects. Such a situation could be a serious problem in the future.

#### GOVERNOR'S ASBESTOS COMMISSION FUNDED

The Commission to Investigate the Use of Asbestos in Schools and Public Buildings received fifty percent of its original funding request for \$100,000. for a one year study.

The Commission held a meeting during July to discuss the best use of the limited funds.

It was decided by the House Commission Chairman, Representative Lois E. Pines and the Senate Commission Chairman, Senator Robert E. McCarthy, and the other members of the Commission that the Director of the Division of Occupational Hygiene would develop a plan of action and a budget for the plan's implementation by the middle of August and present the plan to the Commission for review and approval.

#### MORTALITY IN WESTERN MASSACHUSETTS

The Director of this Division, as a member of the Western Massachusetts Health Planning Council, received a report of a study by Brandon Delaney, Ph.D., Research Associate for the WHHPC, "Age-Sex Standardized Mortality Ratios for Selected Cause of Death in Western Massachusetts: The Standardized Mortality Ratio as a Health Status Factor."





This report presents a preliminary analysis of mortality in Western Mass. It describes the major causes of death and identifies those areas with higher than expected deaths from specific causes.

#### ASBESTOS REMOVAL CONTRACT SIGNED

The Director and a Senior Engineer of this Division participated in the conference held at the State Bureau of Building Construction offices for the signing of the \$125,000. contract for the removal of the asbestos fireproofing insulation from the ceilings of the Administration Building of the Salem State College, Salem.

The contract was awarded to an experienced E. Hartford, Conn., contractor who has been involved with this type of work in Connecticut.

The contract specifies that the removal work will be performed in accordance with the requirements of the federal and state laws.

The asbestos removal operations will be monitored by the senior engineer of this Division. A pre-work air sampling for asbestos fibers was performed before the contractor started his operations, and will be compared with air tests taken during and after the completion of the asbestos removal operation.

This contract is the first removal of asbestos fireproofing insulation from a public school building performed under direct surveillance of this Division.

#### PLAN OF ACTION PRESENTED TO ASBESTOS COMMISSION

A "Plan of Action" including the proposed budget expenditures was presented by the Division Director to the Special Asbestos Commission. The Division received a \$50,000. appropriation to conduct the survey for the Asbestos Commission which was established by the Governor for the purpose of evaluating the extent of the use of asbestos fireproofing in the schools and public buildings of the Commonwealth. Since the appropriation was only 50% of that requested in the proposed minimal budget, the survey will be limited to the public schools in Massachusetts.

The plan includes four basic goals for accomplishing the mission of the asbestos





Commission:

1. To identify those schools wherein asbestos has been used as a spray-on fireproofing material.
2. To determine the extent of asbestos contamination in those buildings.
3. To prepare methods of containment or removal.
4. To determine the economic impact of such corrective measures.

DEPARTMENT COOPERATION OFFERED TO ASBESTOS COMMISSION

The Commissioner of the State Department of Labor and Industries and the Director of the Division of Industrial Safety offered their full cooperation to the Special Asbestos Commission in the implementing of the "Plan of Action" presented by the Director of this Division to this commission.

Approximately 40-50 safety inspectors of the Division of Industrial Safety working out of district offices in Boston, Fall River, N. Andover, Worcester, Springfield, and Pittsfield will obtain information from school superintendents, contractors, and architects, as to which schools were constructed during 1950-1970, and which of these schools were sprayed with asbestos fireproofing insulation during construction.

This identification process will include a walk-through survey and a visual evaluation of the school buildings and the completion of a special survey form prepared by the Division of Occupational Hygiene. The safety inspectors will provide logistical support for movement of the air sampling equipment and bulk material samples.

MASSPORT BRIDGE BLASTING-HAZARDOUS OPERATION

Massport has awarded a contract to a local painter for the abrasive blasting and repainting of sections of the Tobin Memorial Bridge which spans the Mystic River separating Charlestown from Chelsea.

A conference was held at the DOI office with the Massport project engineer, their consultant, representatives of the painting contractor and staff members of



this Division.

A medical control and surveillance program was discussed. It was decided that the blaster/painter employees would be given a complete physical examination by the company physician who would also draw blood samples for baseline analyses by DOH for lead content. These blood studies would be repeated every two weeks.

A non-silica abrasive compound, known as Black Beauty, will be used along with high pressure warm water for the blasting. The blasting operation will be performed from an enclosed ventilated cage wherein the workers would be provided with toxic dust respirators and positive pressure airline hoods. A non-lead paint will be used for repainting the blasted surfaces. The Consultant, Prof. Wm. Burgess of the Harvard School of Public Health, will perform the regular air monitoring. The Division will perform spot check monitoring and survey the operation at regular intervals.

#### INDUSTRIAL VENTILATION AND AIR POLLUTION CONTROL CONFERENCE

The 10th Annual Industrial Ventilation and Air Pollution Control Conference was held October 16-21, 1977, at the University of Connecticut in Storrs. The newly appointed Asst. Engineer of the Division of Occupational Hygiene attended the basic course in ventilation as a trainee.

The course was divided into lecture periods and classroom design problems. The lectures were given by outside consultants or company representatives. There were forty-seven people from the eastern and southern states.

The lectures included principles of air flow, duct design, hood design, air supply, mechanical collectors, electrostatic precipitators, fan types and performances, and noise systems.

The course was designed to give an understanding of ventilation principles and the application to industrial systems. The course was interesting and informative.



INDUSTRIAL BULLETIN NO. 5 REVISED

Industrial Bulletin No. 5 contains the rules and regulations relating to ionizing radiation. The current issue of this Bulletin is dated January 15, 1962. DOH has recently completed a comprehensive review of this document. This review has resulted in the preparation of a draft of a proposed updated revision. A copy of this draft has been submitted to DIS for coordination. In addition, establishment of an Advisory Committee by the Commissioner has been proposed to oversee the final preparation of the planned revision.

SPECIAL SEMINAR ON ASBESTOSSALEM STATE COLLEGE ASBESTOS REMOVAL

Monitoring of the asbestos dust exposure resulting from the contract work of removal of the asbestos ceiling at Salem State College is being done. After less than one week of removal work, the asbestos exposure became substantially higher than that permitted for use of simple dust respirators. An order was issued to change to powered air purifying respirators. The contractor had to stop work until he could supply his men with the proper respirators. The asbestos monitoring will continue for the workers of the contractor and also of the general area to check the use of proper procedures to protect the college students, the public, and employees. The contract is expected to last into December.

ASBESTOS COMMISSION MEETING

An asbestos Commission meeting was held at the beginning of November, in the State House. The meeting was chaired by Representative Lois Pines and Senator McCarthy. The Director of the Division of Occupational Hygiene, presented the October Progress Report of the Asbestos Commission staff. Work for the month included:

1. Completion of the list of coded target schools.
2. Institution of a three phase program.
3. A training session for Division of Industrial Safety inspectors, where





procedures for school inspections were discussed.

4. Continued monitoring of the contracting job at Salem State College for the removal of 26,000 square feet of asbestos "spray-on" coating.
5. Development and refinement of pertinent laboratory and field techniques.

Mr. John Calabro, of the Department of Education, spoke and offered his department's resources and cooperation for the project.

Mention was made of media coverage of the asbestos program and its possible effects.

Finally, a special subcommittee was formed to decide how to evaluate and report the school inspection results.

#### TOWN GARAGE EMPLOYEE EXPOSED TO CARBON MONOXIDE

Our Division investigated carbon monoxide exposure of an individual employed in a town garage. The investigation was initially obstructed by the foreman, but the survey was finally allowed to take place. Excessive carbon monoxide exposure was found from many vehicles in operation in the garage. Increasing ventilation to the garage was recommended. This incident serves to emphasize the need to provide occupational health and safety legislation for public employees, already available for workers in private industry.

#### ASBESTOS IDENTIFICATION BY INFRARED SPECTROPHOTOMETRY

The identification of asbestos is a difficult and time consuming procedure. A number of techniques are available, but none of them is considered completely adequate for this purpose. However, by utilizing the best features of available procedures, satisfactory results may be achieved. Our Division currently uses phase contrast and Electron microscopy, X-ray diffraction, and dispersion staining. Now infrared instrumentation has been added to our overall asbestos analysis scheme.

#### DOH PROVIDES INFORMATION TO ASSOCIATED PRESS

Alerted by the Boston Globe's study of a possible elevated cancer incidence at the Portsmouth, New Hampshire, Naval Shipyard, a reporter from the Associated Press requested this Division to provide information as to industrial users of large





sources of radioactive material in Massachusetts.

This information was obtained by reviewing the registration file which serves as an index of users.

#### HIGH SCHOOL REPAIR PROGRAM PRESENTS ASBESTOS HAZARD

Representatives of the City of Newton PTA and the designated engineering firm met at the Division of Occupational Hygiene to discuss the potential asbestos hazards and the hazard controls for the Phase 2 contract bid for work on the heating, ventilating and air conditioning system at the North High School in Newton.

This Division agreed to perform the monitoring of the workers and of the school in general for asbestos during the Phase 2 work which will be performed during the summer months.

#### ASBESTOS SUB-COMMITTEE SETS STANDARDS

At a meeting with the Asbestos Commission's sub-committee to determine exposure criteria, the staff reported on data for air sampling of schools for asbestos, and on sampling in non-asbestos schools for background fiber counts. It was decided that air sampling data for asbestos of 0.02 fibers per cc represented the lower limit of significance, as schools without any spray-on asbestos showed air sampling data of this order of magnitude.

The staff and commission took up the problem of developing a numerical index representing the degree of hazard from the condition of the spray-on, the percentage of asbestos in the spray-on, the accessibility of the coating in the school, the friability, and whether the material is in an air moving system. The Index numbers are now being applied to the schools of the survey.

#### WHO IS RESPONSIBLE FOR LNG PROBLEMS?

The Massachusetts Department of Public Utilities has the primary responsibility for regulating the use and handling of natural gas. OSHA, the Mass. Department of Labor and Industries, and the Department of Public Safety may have indirect involvement.

The Department of Public Utilities has in effect since 1972, a Gas Distribution



Code (a copy is available) which provides specifications for (1) the design, construction, operation and maintenance of plants which liquify, store and vaporize natural gas and (2) certain aspects of the use of truck transports for liquid natural gas.

This definition raises the possibility that OSHA may have some jurisdiction based on the constituents found in the natural gas. Aside from this, OSHA's involvement is rather vague since OSHA regulations do not specifically address natural gas. OSHA, however, can invoke the general duty clause when all else fails.

The Mass. Division of Occupational Hygiene and the Mass. Division of Industrial Safety may loosely be involved since OSHA's involvement is not clearly defined. If OSHA does not have a standard, our Department is not pre-empted, and therefore Massachusetts Labor Laws may apply.

The Department of Public Safety becomes involved when storage involves at least 10,000 gallons of flammable materials. Inspections are not at present made on a regular basis, but annual inspections are being proposed.

In summary, the jurisdiction of health and safety over workers exposed to natural gas is not clearly defined. It appears that the Dept. of Public Utilities has the most clearly defined responsibility.

The Dept. of Labor and Industries and OSHA have responsibility for the safety and health of the workers at these establishments. If OSHA will not act, then our Department should assume the responsibility.

#### INDUSTRIAL CARCINOGENESIS -- SUBJECT OF MEETING

Several staff members attended the bi-monthly meeting of the New England Section of the American Industrial Hygiene Association which featured as the main speaker, Dr. Edward Massaro, Director of Chemical Carcinogenesis at the Mason Research Institute in Worcester.

Dr. Massaro spoke on the cancer causing substances in the workplace.



### WORK PLAN FOR THE ASBESTOS COMMISSION PROGRAM

The work for the Asbestos Commission which is targeted to be completed by June 30, 1978, is the following:

A list, with assigned code numbers, of all public schools constructed or having major renovations during the time period of 1946 to 1972.

A walk-through survey of the above schools by the Division of Industrial Safety Inspectors to gather information on the individual schools plus bulk samples of any spray-on insulation.

Analyses of the bulk samples for the presence of asbestos.

Air sampling of schools for asbestos will be limited to a few schools in specific areas, and done by the commission staff.

An interim progress report which will summarize all the data collected will be submitted on April 30.

Complete surveys in certain designated areas.

The data on walk-through surveys will be evaluated.

### OUTBREAK OF RESPIRATORY PROBLEMS IN STATE OFFICE BUILDING

Several employees on the fifth floor of the John W. McCormack State Office Building complained of headaches, dryness of throat, skin irritation, inflammation of nose tissues, joint pains and nausea. Some of the workers were affected enough to take sick leave. At one point also the floor was evacuated.

Over a period of three weeks, our Division performed a series of chemical and physical measurements on the air. The only positive (but not excessive) chemical finding was for ozone which was traced to a photocopy machine. It was also noted that some of the rooms were very warm, as high as 80°F. It was calculated that four air changes occur per hour. This assumed that all the air circulated was evenly distributed, but this may not have been the case since there was little air movement and a certain staleness detected. ASHRAE recommends 6 - 8 air changes per hour.





It was concluded that the main problem was inadequate ventilation, but the condition was worsened by the presence of odors from the copy machine and cigarette smoke.

#### ASBESTOS ALERT RECEIVES WIDE PUBLICITY

A news release by this Division on the asbestos hazard exposure to workers who were employed by the shipyards during the war years in Massachusetts was issued as a follow-up of the alert by the Secretary of Health Education & Welfare.

Television stations, Channel 2, and Channel 5, videotaped the Director and members of the Asbestos Commission, describing the health hazards from asbestos exposure, the recommended action plan, and how asbestos fiber air samples are counted in our laboratory. Several newspapers and news sources, such as, the United Medical Society, covered the news release.

#### ANNUAL AMERICAN INDUSTRIAL HYGIENE CONFERENCE

The Director of the Division of Occupational Hygiene attended what has been called the world's largest occupational health conference, held in Los Angeles, California. This international conference featured more than 300 original papers on various facets of the ever-growing list of occupational health and related concerns. Professionals from industry, government, labor, academic and consulting groups met to discuss the ever-pressing workplace health issue of our times.

This Conference afforded the chance of up-dating developments in occupational health.

#### PUBLIC HEARING HELD ON REVISED RADIATION RULES

In accordance with Chapter 30A, Section 2, of the General Laws of Massachusetts, a public hearing was held on the revisions of Industrial Bulletin #5, Rules and Regulations, for the protection of the Health and Safety of Employees from Occupational Diseases Caused by Ionizing Radiation. The last revision was approximately 15 years ago, and thus it was deemed necessary to up-date these rules and regulations so that



they would be in harmony with the Federal requirements issued by the U.S. Nuclear Regulatory Commission.

Asst. Commissioner James Snow represented Commissioner Nicholas Roussos at this hearing.

Several changes were submitted and adopted by the Advisory Committee appointed by the Commissioner.

#### ASBESTOS SUB-COMMITTEE DEVELOPS "FERRIS INDEX"

The Asbestos Commission's Subcommittee on Standards discussed the development of a simplified numerical rating systems for each of the 1436 schools in the special survey project being performed by this Division, funded by the Asbestos Commission. Dr. B. Ferris, a member of the Asbestos Commission, suggested a method of generating a single number for each of the schools (a school may be assigned more than one number if more than one type of spray-on coating is present) which would give a general overview of the degree of potential asbestos exposures associated with the school's sprayed-on construction material. The numerical value generated from the "Ferris Index" incorporates data of five important parameters. The numbers assigned to the following criteria are added together; (1) accessibility, (2) condition, (3) friability, and (4) existence in an air moving system. The sum is then multiplied by the value given to the variable, percent composition of asbestos. These final values are then grouped into one of five categories, each of which delineates the action required.

#### ASBESTOS CONFERENCE

On June 25 - 27, Ms. Karen Irving, Asbestos Commission staff supervisor, attended the International Conference on Health Hazards of Asbestos Exposure in New York City. The conference was sponsored by the New York Academy of Sciences.

All aspects of the asbestos health hazard issue were discussed by medical researchers, scientists, lawyers, labor and public-interest representatives, and



government officials.

The major topics of discussion were (1) the epidemiology of asbestos-related diseases, (2) sampling and analytic techniques for measuring and identifying asbestos, (3) asbestos standards, (4) workplace control of asbestos, (5) public health control of environmental asbestos disease (such as schools), (6) the legal rights and compensation for exposed workers, and (7) future problems to be anticipated.

This was an important meeting in that the most up-to-date research developments and information were presented to those in attendance in a comprehensive, useful approach.

#### DNA RECOMBINANT RESEARCH PROBED

In view of the newspaper publicity and inquiries by concerned workers and inspectors of our Division of Industrial Safety office in Worcester concerning the DNA recombinant research underway at the University of Massachusetts, Medical Center in Worcester, a meeting was arranged at the Medical Center for a meeting with Medical Center staff members, DIS staff members (Worcester office) representatives of the trade unions involved, and the Safety Director and councilmen of the City of Worcester. Representatives from Region I of the National Institute for Occupational Safety and Health participated on invitation by this Division.

Dr. Dul, Chairman of the Medical Center's Biohazards Committee and Dr. White, Chief of Microbiology, who is directly involved in the DNA research discussed the precautions followed as required by the guidelines published by the National Institutes of Health.

All present DNA recombinant research at this time is at the P-2 level or "low risk level" as defined by the guidelines. The Biohazards Committee and the soon-to-be appointed Medical Center Safety Director are responsible for enforcement of the precautions contained in the guidelines.

The meeting was concluded with a walk-through survey of the two DNA research laboratories, at which time, the various safety precautions and methods of decontamination were discussed.





## CHEMICAL SECTION

### OZONE EXPOSURE AT SEWERAGE TREATMENT PLANT

Ozone is frequently used to mask the odor of sewerage in treatment plants so that the inhabitants of the neighborhood are not burdened with the ordinarily noxious odors. The Division investigated ozone exposure inside a sewerage treatment plant recently where it was found that the workers were being subjected to excessive levels of this gas. Our investigation showed that there was a serious leak in the ozone generating system. Upon our recommendations, the system was repaired and ozone levels are now well below the acceptable limits.

### LEAD POISONING IN CHILDREN OF LEAD WORKERS

A telephone call from a pediatrician who reported that he was treating a 4-month old child of a battery worker for lead poisoning prompted the Division to investigate the source of lead exposure. A survey of the worker's place of employment was made. Air tests showed that the highest lead level was found in the operation performed by the child's father. Blood lead tests performed by our Division revealed that three workers had exceptionally high lead levels. One of these workers was performing the job ordinarily done by the poisoned child's father. Another worker, it was reported, also had a child with an elevated blood lead level. The third worker was unmarried. Faulty ventilation, improper utilization of existing ventilation, and poor work habits were the causes of the lead exposure in the plant. The children involved, it is believed, were contaminated from work clothes worn at the plant and laundered at home. The plant now provides all workers with work clothing which is to be left in the plant, laundering services, and showering facilities. The Division has extended this investigation by contacting the families of all the lead workers and arranging for children and spouses to be tested for lead absorption by their local boards of health. Similar studies are being carried out by this Division in other plants where lead is handled.





### WOMEN IN INDUSTRY

Several staff members of this Division attended the regular meeting of the New England Chapter of the American Industrial Hygiene Association at which time Mrs. Ellen Rosnowski, M.S., and OSHA Compliance Officer, spoke on the health hazards affecting female workers in this country. Such factors as ergonomics, susceptibility and other working conditions which may cause occupational diseases were discussed.

It may be necessary to revise jobs to fit the female worker. This would include specially designed tools and working practices.

The female workers in Massachusetts can no longer depend upon the prior labor laws offering special protection. The State Attorney General has ruled that the female worker has the same work rights as the male worker.

### BLOOD LEAD PROGRAM FLOURISHES

In July of 1976, shortly after the acquisition of an Anodic Stripping Voltammeter, the Division began its blood lead screening program of industrial workers. For the six month period of that year two hundred and forty analyses were performed.

Interest in our blood lead testing has become widespread and samples have been received from such diverse industries as lead battery plants, de-leading groups, foundries, plastics companies, fluorescent bulb manufacturers, jewelry and wire fabricators.

Between January 1977, and October 1977, we have analyzed one thousand samples and it appears that the program will continue to expand.

### POLICE STUDENTS INTRODUCED TO OCCUPATIONAL HEALTH HAZARDS

Police are frequently first to respond to industrial fire and accident emergencies. To prepare them for this rôle, the New Bedford Police Academy has introduced recognition of occupational hazards in their curriculum. Our Chief of Chemical Services, along with representatives from industry and the local fire Department, reviewed the risks of fire, explosion and gas and vapor exposure hazards in industry and how they should be dealt with when the police are called for assistance in emergencies.



The class consisted of 26 student-officers from New Bedford and various communities in the vicinity of New Bedford.

#### ANNUAL AIHA REGIONAL MEETING

Members of the Division's technical staff attended the American Industrial Hygiene Association, New England Section's, Annual Technical Conference in Marlboro, Mass. The emphasis of the meeting was the prevention of the occupational diseases of the future through actions today.

Talks were presented by occupational hygiene physicians, industrial hygienist in government and industry, and a workers' compensation lawyer. Topics discussed were: asbestos and cadmium exposure, experience with unions in the establishment of health programs for their members record keeping systems which consider future change, workers' compensation for occupational diseases, and methods of preventative industrial hygiene.

#### EXPOSURE OF STATE EMPLOYEES TO CHEMICAL VAPORS

An investigation was made of a printing operation in a state office building where isopropyl alcohol is continuously emitted during the operation of a printing press. The room in which this printing press is housed had not been designed for the purpose for which it is now being used and, therefore, no exhaust ventilation is present for the control of the solvent vapors. A similar situation existed in the dark room where vapors from toxic chemicals escape from open pans into this closetlike room which is also not equipped with adequate exhaust ventilation. Recommendations were made for improvements.

The outcome of these recommendations will depend on voluntary compliance by the department head, since public employees are not covered by existing health and safety laws.

#### CARPET CEMENTS PRODUCE EYE AND NOSE IRRITATION

A visit was made to investigate an employee complaint of burning eyes and nasal irritation in an electronics firm in Burlington. The building housing this company is new, and the office carpeting only put down two weeks prior. This was the area





and timing of the complaint where approximately 40 people are employed. It was quite noticeable walking through the carpeted areas that the offensive odor was stronger in the more recently carpeted areas and very little odor in the uncarpeted area. The strongest odor was present in the main foyer where there is twice as much carpeting because of the stair. The cement used in securing the carpet was incriminated. Further use of this particular type of cement was discontinued. Aeration of existing installations for several days was recommended.

#### INDUSTRIAL CONTROLS NEED NOT BE EXPENSIVE

A visit was made to a jewelry manufacturing plant where very excessive exposure to ethyl acetate had previously been found. The work practice which had been responsible for these high exposures consisted of the saturation of cloths used to wipe excess paint from jewelry pieces. By simply containing the ethyl acetate in closed dispensers at each work station, levels were reduced to well below the acceptable standards.

#### HOME DELEADING CAN BE HAZARDOUS

A representative of the State Department of Public Health's Childhood Lead Poisoning Prevention Program asked this Division's cooperation in setting up a program to prevent lead poisoning among children whose parents were engaging in deleading their homes. There have been authenticated cases of lead poisoning of children living in homes being deleadied by uncontrolled sanding and heating of lead painted surfaces.

It was agreed that the Childhood Lead Poisoning Prevention Program would obtain blood samples from the children and parents and submit the samples for lead analyses by this Division. If blood samples can not be obtained from the parents, then urine samples will be obtained and the analyses for urinary lead excretion will be performed by this Division.





This Division will provide air sampling equipment to the special program and will perform the lead-in-air analyses.

Also, this Division will provide literature on required approved respiratory protection, safe operating procedures and information on lead as a health hazard.

#### A NEW TOXIC AGENT

A recent report by a Board of Health and a hospital physician resulted in tracking down a probable new toxic agent. The material is a catalyst used in the production of plastic foam, - MIAX ESH. Workers at the plant complained of vague problems in urination. The problems were difficult to measure by medical tests but the type of problem was consistently reported. A similar problem recently occurred in a plant in Baltimore. Both plants had recently introduced the catalyst and it was subsequent to this that worker complaints began. The plastic manufacturer was advised to stop using the material and the producer of the catalyst was informed of the problem. OSHA, and the physicians were also informed.

Subsequently, a meeting of NIOSH, OSHA, Union members, company officials, and the chemical supplier was held to determine what action was to be taken. It was decided that the first step would be to determine the extent of the disease problem by medical questionnaire and urine tests. These steps will be followed by physical examinations on selected individuals. Further action will wait on the results of these tests.

#### JEWELRY WORKERS IN MASSACHUSETTS

A mortality study of jewelry workers was undertaken in an effort to identify any special risk in this work group. The study was done by reviewing 931 deaths in Attleboro men which occurred between 1956 and 1975. All those selected were noted on their death certificate to have been jewelry workers. The distribution of deaths was compared to that for the U.S. as a whole on an age standardized basis. The results suggested a possible small excess of pancreatic cancer and peptic ulcers,



Further investigation of the polishers in this industry suggested, in addition, a possible risk of stomach cancer. Work histories are not complete and employees are not tested. A follow-up study is under consideration to look at this problem more closely with the help of the jewelry industry.

#### NEW CHEMICAL CAUSES EMPLOYEE ILLNESS

The Board of Health of a north shore town alerted this Division to illness complaints by several employees in a foam manufacturing plant.

A new chemical catalyst used in the foam-producing operation was suspected of causing urinary problems among several of the workers. The Division's Occupational Hygiene Physician had been alerted a week before by a colleague in Baltimore where a similar problem had been encountered.

The Massachusetts plant, upon request, withdrew the new chemical from the production process. Our physician and associates surveyed 215 employees of this plant. He found that over 100 employees had some effects from exposure to the new chemical catalyst. All employees are improving as far as symptoms are concerned. Eight employees showing the least improvement were examined in detail at the Boston University Medical Center. Of the 8 employees examined, 5 employees showed some abnormal findings, 2 employees showed significant abnormalities. Various neurological tests including nerve conduction tests and certain urological tests including, bladder function tests were completed at the B.U. Medical Center.

Subsequent follow-up by our physician revealed that all but two of the employees have fully recovered. Further follow-up tests will be made of the two worst affected workers. Medical surveillance will be maintained until all workers are fully recovered.

#### THE 57th ANNUAL MASSACHUSETTS SAFETY CONFERENCE

Our Senior Chemist attended the two-day meeting of this Annual Safety Conference. He attended pertinent sessions such as Fundamentals of Occupational Safety; Research & Development, including, The Future of Carcinogens in the Laboratory; Laboratory



and Chemicals session; Industrial Vision Safety; and the Industrial Hygiene Program. The conference was considered to be of great instructional value.

#### WARNING TO DELEADING WORKERS

As a result of several domestic lead poisoning cases reported to this Division by physicians and hospitals, a news release was issued by the Division warning home owners and dwellers, as well as those undertaking house deleading as a new business venture that a lack of understanding of the lead hazard and poor control methods may result in excessive exposures to those performing the deleading and to other occupants.

Each respondent to the news release was provided with a packet of material which included a discussion of the lead hazard, standard safe operating procedures for removing lead-based paint, a list of approved respirators, a list of Massachusetts sales representatives of companies selling the approved respirators.

#### DIVISION PARTICIPATES IN COMMITTEE MEETING

The subcommittee of the American Conference of Governmental Industrial Hygienists on halogenated hydrocarbons held an all-day meeting in the Division's Conference Room. This committee, on which the Asst. Director serves, has the responsibility of recommending air standards for halogenated substances such as, trichloroethylene, methylene chloride and related compounds to the main TLV committee. This meeting was followed by a two day meeting of the full TLV committee which was held at the Harvard School of Public Health.

#### FUMES FELL HOSPITAL WORKERS

The Division was requested to investigate complaints of respiratory irritation, nausea and vomiting by some office workers in a hospital. The first complaints were made about two weeks before our visit when a strong musty odor was detected in the office area. The odor was traced to a clogged drain which was subsequently cleaned.

The odor disappeared, but the complaints did not. In fact, on the day of our visit, three female office workers were taken to the out-patient emergency room. One of them was kept overnight for observation.





On this same day at about 3 p.m. a strong petroleum type odor was noticed and was traced to one of the fresh air supply ducts in the office. The fresh air intake was located in the engine room facing a parking lot where one of the cars parked illegally, close to the engine room was found to have a leaking gasoline tank. The gasoline fumes were being drawn into the building through the ventilation system.

This incident, of course, did not explain the earlier complaints, but it did point out an avenue for contaminants to enter the building. It was also learned that the eye irritation experienced by the workers was transient but was most pronounced between 11:30 a.m. and 12:00 noon, and again around one o'clock. It was hypothesized that during these times, automobiles were arriving and leaving for the lunch break, and exhaust fumes, in concentrations too low to give an odor, but high enough to produce the respiratory symptoms were being drawn into the office area through the ventilation system. Automobiles are no longer allowed to park in this area, and the problem appears to have disappeared.

#### BLOOD LEAD PROFICIENCY TESTING PROGRAM

The Division laboratory is participating in a blood lead proficiency testing program administered by the West Allis Industrial Toxicology Laboratory, West Allis Memorial Hospital, West Allis, Wisconsin 53227.

#### MYSTERIOUS AGENT FELS WAREHOUSE WORKERS

A radio broadcast recently reported that 15 workers were hospitalized by an unknown toxic agent. Our investigation of this incident revealed that only 7 women were affected and they were taken to the emergency room of the local hospital, but were not admitted. Symptoms reported were: nausea, difficulty in breathing, tightness in the chest and burning eyes. The plant was a clothing warehouse and the only odor detectable was that of phenol formaldehyde resins frequently noticeable in new clothing. Air tests for formaldehyde, however, revealed only low levels of this gas in the air (less than 1 ppm). From our interviews with workers who had been affected





earlier, It was learned that eye irritation was of secondary importance. The chief complaints were heat, throat dryness, difficulty in breathing, and a lack of air circulation. Following the outbreak of illness, twelve pedestal fans were installed in the warehouse. Environmental conditions on the day of our visit were quite tolerable. No one had any complaints.

It should be mentioned that a similar incident occurred at this plant about two months ago and we recommended the installation of pedestal fans to increase the circulation of air. This was done and no further complaints were reported. The second episode occurred two days after a television report of formaldehyde exposure in homes insulated with urea-formaldehyde resin foam.

#### MEDICAL SECTION

##### PLANNING FOR OCCUPATIONAL DISEASE CONTROL

The Division has been asked twice in the last month to assist in developing programs to control selected occupational disease problems. Dr. Wegman consulted with the Governor's Task Force on Cancer, advising the panel on approaches to the control of cancer thought to be occupational in origin. He stressed the use of death certificates to identify and keep track of occupational cancer risks in Massachusetts. Furthermore, he noted that no agency has accepted the responsibility to watch over those workers known to have had exposure to occupational carcinogens in the past but no longer employed (e.g. asbestos and vinyl chloride). Later this past month Dr. Wegman sat with the American Lung Association of Massachusetts to help them identify approaches to education about and control of occupational lung disease. This was the first of a series of meetings to develop a state and regional approach to this problem. Dr. Wegman has been urged to serve on a regular basis with this working group while it formulates and develops its program.

##### A STUDY OF CANCER RISK IN DPW ROAD CREWS

A report that three workers in a Mass. Department of Public Works road crew suffered throat problems including throat cancer, tumors and polyps, prompted our



Division to investigate their working conditions. It was also learned that earlier one worker had died of throat cancer. The crew in question is ordinarily involved in highway maintenance. During the winter months they also mix sand and calcium chloride with a front loader and load it on trucks for sanding crews. Calcium chloride is not known to be a carcinogen. Our Division is currently making an epidemiological study of all Public Works employees. Death certificates of road crews are being reviewed to determine if in fact a higher than normal cancer risk is involved with this work. Further action on this matter will be determined by the results of this study.

#### INDUSTRIAL AND ENVIRONMENTAL CARCINOGENS SEMINAR

The Director of this Division attended a special seminar on Industrial environmental carcinogens sponsored by the Massachusetts Division of the American Cancer Society in cooperation with the U.S. Dept. of Labor's Occupational Safety and Health Administration (OSHA).

The papers on industrial carcinogens were given by well known authorities and included "Basic Epidemiology and Occupational Health"; Overview of Industrial Carcinogens", "Ways of Controlling Carcinogen Exposure", OSHA Carcinogen Regulations", and "Chemical Carcinogens". The papers on environmental carcinogens included "Overview of Environmental Carcinogens" and "Effects of Smoking on Heavy Users and Females."

These papers helped update the available information on carcinogens, particularly those encountered in the workplace.

#### EMPLOYEE MORTALITY STUDY IN AN ELECTRICAL INDUSTRIAL PLANT

The Division's Occupational Hygiene Physician completed an epidemiological study of the mortality among employees in an electrical plant complex located in a western Massachusetts city of over 50,000 population.

The use of chemicals in industry has become increasingly common, producing varied and pervasive exposures to toxic substances for many workers. This has led to an increasing interest and concern in assessing the workers' health in relation to



the work environment.

The objective of this study was to determine whether any health problems exist in selected Massachusetts industries by examining the relative frequency of death from specific causes among the employees of a particular industry, and comparing these to the relative frequency of death from specific causes among the general population in the same community. Where large differences in these frequencies occur between workers of the industry under study and the general community, such data would suggest further investigation to determine whether a health problem truly exists in that industry.

#### AMERICAN LUNG ASSOCIATION LOOKS AT OCCUPATIONAL HEALTH

A seminar for nurses, physicians, safety engineers, industrial hygienists, and other health care personnel on occupational health on pulmonary disease was held at Bentley College in Waltham. The Chief of Chemical Services took part in panel discussions on three case histories of lung disease, presenting the industrial hygiene aspects of the problems. There were nearly 250 attendees at the day long program.

#### STAFF ATTENDS HEART SAVER COURSE

Four members of the Division's staff attended the three hour Heart Saver Course taught by the Boston Fire Department. In addition to lectures on the Heimlich technique and instructions on CPR (Cardio Pulmonary Resuscitation), hands-on training was given on a specially designed mannequin. Each participant performed the CPR techniques until the instructor considered the participant as competent.

#### NURSING SECTION

##### NURSING ACTIVITIES - JULY

There were only six plant visits during this month. Most companies had plant shutdown during this period.

A meeting was held with the Director of the Massachusetts Lung Association relative to assisting them with television and radio programs on respiratory problems





in the workplace. They are also planning to present courses to occupational health nurses on respiratory diseases.

Notification has been received that another article, written by the nurse, has been accepted for publication. This makes a total of three which have been accepted.

#### NURSING ACTIVITIES - AUGUST

There were 17 visits made to Industries - 62 recommendations were submitted. Sixteen former recommendations have been adopted.

A paper was written and has been accepted by the Occupational Health Nurses Magazine. It will be published in the October, 1977, issue.

Bulletin #13 has been completed and is ready for printing. This is a nursing bulletin and has been prepared for audiometric procedures.

Preparation for a three day course in audiometric procedures has been started. This course is certified and will be given in conjunction with the Boston Guild for the Hard of Hearing October 3, 4, 5, 1977.

#### NURSING ACTIVITIES - September

There were no nursing activities during the month of September.

#### NURSING ACTIVITIES - OCTOBER

The Supervising Occupational Hygiene Nurse actively participated in the audiometric certification of seventeen students at the Boston Guild for the Hard of Hearing.

A three hour lecture was given to fifty master students at Boston University.

The Supervising Occupational Hygiene Nurse officially retired from her position to become effective in December. Her last day of scheduled work will be November 25, then nine days of vacation bringing her official termination date to December 3.

#### NURSING ACTIVITIES - NOVEMBER

There were no nursing activities during the month of November.

#### NURSING ACTIVITIES - DECEMBER.

There were no nursing activities during the month of December.



NURSING ACTIVITIES - JANUARY

There were no nursing activities during January.

NURSING ACTIVITIES - FEBRUARY

There were no nursing activities due to position vacancy during February.

NURSING ACTIVITIES - MARCH

There were no nursing activities this month due to the vacancy of the Supervising Occupational Hygiene Nurse position.

NURSING ACTIVITIES - APRIL

The new Supervising Occupational Hygiene Nurse made six plant visits to discuss occupational nursing procedures.

An outline form was prepared by our new nurse on "Conduct of an Industrial Visit by the Occupational Hygiene Nurse Consultant."

NURSING ACTIVITIES - MAY

Three seminars sponsored by Professional Organizations were attended. The subjects covered were:

1. Recognizing and Preventing Occupational Disease.
2. Respirators - Selection and maintenance.
3. Occupational Health Up-date.

The symposium on Occupational Disease was particularly interesting and helpful. As a nurse working in Occupational Health, it will assist me in recognizing, referring and preventing work related medical problems.

Seventeen visits were made to industrial plants. Thirty-seven recommendations were made.

NURSING ACTIVITIES - JUNE

A meeting with Mr. Peter Moles, Supervising Inspector, Division of Industrial Safety, Fall River, proved to be very informative and helpful. Emphasis during this discussion was on the teamwork of the safety and health specialists. An understanding of the specific functions of each team member was developed. There are plans for



additional meetings with the Division of Industrial Safety staff members throughout the State.

A profitable conference was held with Mrs. Rena Casey, Occupational Health Consultant for American Mutual Insurance Co. Current practices and responsibilities of the Occupational Health Nurse were reviewed. The types of Health Service programs in industry were considered. The approach of the occupational health nurse consultant to industry and the types of assistance offered by her to the industrial health program were explored.

Another meeting for an exchange of ideas and pertinent literature is planned.

There were 17 plant visits made in June, and thirty-nine recommendations were submitted.

A requested visit was made to investigate a dermatitis problem. The causative agent was determined to be scabies.



SOURCES OF INQUIRY

<u>Source</u>	<u>Services</u>	<u>Information</u>	<u>Total</u>
Division of Industrial Safety	46	6	52
Follow Up	21	--	21
Radiation Surveys	206	--	206
Self-Initiated	69	--	69
Employer	75	112	187
Labor Union - Employees	79	44	123
Government	37	47	84
Physicians-Hospitals	31	17	48
Dentists	17	--	17
Nurse	1	10	11
Consultants-Contractor	4	36	40
Research	-	6	6
Schools	14	14	28
Professional Organization	3	8	11
Non-Prof. Organization	.	24	26
Insurance	5	12	17
Non-Official Agency	2	--	2
Attorneys	1	12	13
OSHA	2	3	5
Publisher	-	5	5
Communications	2	4	6
Libraries	1	3	4
Tenants, Citizens, etc.	<u>3</u>	<u>25</u>	<u>28</u>
	621	388	1009
Out of State Requests		48	48





FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONSSUMMARY BREAKDOWN

<u>Classification</u>	<u>Different Types</u>	<u>Investigations</u>
A. <u>Chemicals</u>	32	(526)
Solvents	50	233
Metals	12	153
Gases	14	123
Others		
Fumes, Mists, Smoke	6	17
B. <u>Dusts</u>	7	(264)
C. <u>Physical Hazards</u>		505
Noise		92
<u>Radiation</u>		
Radioactivity		100
XRadiation		92
Microwaves		31
Illumination		2
Heat Stress		4
Ventilation		95
D. <u>Miscellaneous</u>		(6)
Recombinant DNA		1
ESH Catalyst		3
Waste Disposal		<u>2</u>
	TOTAL	1302



FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONSHARMFUL SUBSTANCES AND CONDITIONS

Acetone	5	Dichloroethane	1
Acrylonitrile	9	Dust, H.O.C.	25
Ammonia	7		
Antimony	6	Epichlorohydrin	1
Atmospheric Pollutants, H.O.C.	9	Epoxy	2
Asbestos	201	ESR Catalyst	3
		Ethylene Dichloride	1
Benzene	1	Ethyl Acetate	5
Butyl Acetate	4	Ethyl Alcohol	1
Cadmium	2	Fibrous Glass	2
Carbitol	1	Fluorides	4
Carbon Dioxide	8	Formaldehyde	13
Carbon Monoxide	53	Freon	3
Chloroform	1		
Chlorine	2	Heat Stress	4
Chromates	6	Hydrogen Sulfide	2
Coal Tar Fumes	2		
Cobalt	1	Illumination	2
Combustible Gases, H.O.C.	2	Isobutyl Alcohol	1
Cotton Dust	3	Isopropyl Acetate	1
Copper	13	Isopropyl Alcohol	15
Cyclohexanone	1		
		Kerosene	1
		Ketones, H. O. C.	2
Diacetone Alcohol	2		
Dioxane	2	Lead	72



Mercury	24	Pentanone-2	1
Metal Fumes	4	Perchloroethylene	4
Methane	1	Phenol	1
Methanol	3	Polychlorinated Biphenyls	1
2-Methoxy Ethanol	1	Radioactivity	190
Methyl Butyl Ketone	1	Recombinant DNA	1
Methyl Chloroform	10	Rosin Fumes	1
Methylene Bisdiphenyl Diisocyanate	3	Safety	1
Methylene Chloride	9	Selenium	2
Methyl Ethyl Ketone	13	Silica	31
Methyl Isobutyl Ketone	8	Silver	4
Methyl Methacrylate	1	Smoke	2
Microwaves	31	Stoddard Solvent	1
Mineral Spirits	6	Styrene	6
Monomethyl Amine	3	Tetrahydrofuran	1
Monomethyl Ethyl Acetate	1	Tin	5
Naphtha	12	Trichlorobenzene	1
Nickel	5	Trichloroethylene	4
Nitrogen Dioxide	6	Toluene	29
2-Nitropropane-1	1	Toluene Diisocyanate	9
Noise	92	Tungsten	1
Oil Mist	2	Ventilation	95
Organic Vapors, N.O.C.	19	Vinyl Chloride	1
Oxygen	1	Waste Disposal	2
Ozone	4	Welding Fumes	5





Wood Dust	2
Y-Radiation	92
X-Radiation	92
Xylene	25
Zinc	13

TOTAL 1302

#### CLASSIFIED BY ACTIVITIES

Nursing Consultations	54
Medical Consultations	16
Meetings	130
Talks/Papers	28

#### INFORMATION REQUESTS

Safe Practice Bulletins (Complete Sets)	191
Safe Practice Bulletins (Singles)	700
Annual Reports	3
Industrial Bulletins	40
Special Bulletins	210



FIELD WORK

	<u>Plant Visits</u>	<u>Other Visits</u>	<u>Total</u>	<u>Talks</u>
Director	2	40	42	5
Engineers	739	107	846	4
Physician	15	14	29	4
Nurse	72	35	107	5
Scientists	<u>264</u>	31	345	7
Total	1092	<u>277</u>	<u>1369</u>	<u>25</u>

RECOMMENDATIONS MADE

Environmental	1751	Workers affected	16,545
Health Services	<u>220</u>	Workers affected	<u>23,954</u>
Total	1971	Total	40,499

RECOMMENDATIONS COMPLETED

Environmental	5	Workers affected	356
Health Services	<u>31</u>	Workers affected	<u>3950</u>
Total	36	Total	4306



ENVIRONMENTAL TESTS

<u>Substance or Condition</u>	<u>Number</u>	<u>In Harmful Exposure Range</u>
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PHYSICAL HAZARDSRadiation

Radioactivity	3053	14
X-Radiation	2269	90
Microwaves	196	13

<u>Heat Stress</u>	5	0
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<u>Illumination</u>	24	14
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<u>Noise</u>	1359	651
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<u>Ventilation</u>	609	197
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CHEMICAL HAZARDS

Acrylonitrile	4	0
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Ammonia	4	1
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Carbon Dioxide	16	0
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Carbon Monoxide	476	127
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Chlorine	9	2
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Combustible Vapors, H.O.C.	3	0
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Formaldehyde	15	0
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Hydrogen Sulfide	2	0
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Isopropyl Alcohol	2	0
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Mercury	439	73
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Methane	2	0
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Methyl Ethyl Ketone	1	0
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Methyl methacrylate	1	0
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Nitrogen dioxide	21	0
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Oxygen	2	0
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Ozone	2	0
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Styrene	4	0
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Xylene	3	0
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Total	3526	1132
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AIR SAMPLES COLLECTED5. DUSTS

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Asbestos	478	27
Clay	2	0
Cotton	3	0
Dust, H.O.C.	50	7
Fibrous Glass	5	0
Iron Oxide	8	0
Oil Mist	6	0
Silica	83	10
Smoke	2	0
Wood	<u>1</u>	<u>1</u>
Total	648	45





AIR SAMPLES COLLECTED2. CHEMICALS

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Acetone	7	0
Acrylonitrile	43	0
Ammonia	3	3
Antimony	54	0
Atmospheric Pollutants, H.O.C.	1	0
Benzene	2	0
Butyl Acetate	1	0
Cadmium	1	0
Carbitol	2	0
Chloroform	5	0
Chromates	15	1
Coal Tar	2	0
Cobalt	5	0
Copper	111	2
Cyclohexanone	4	0
Diacetone Alcohol	8	8
Dichloroethane	2	0
Dioxane	2	0
Epichlorohydrin	4	0
Ethyl Acetate	6	1
Ethyl Alcohol	2	0



AIR SAMPLES COLLECTED2. CHEMICALS

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Fluorides	6	0
Formaldehyde	14	1
Freon	2	0
Iron Oxide	3	0
Isopropyl Alcohol	50	0
Ketones, H.O.C.	5	0
Lead	215	52
Methanol	5	0
Methyl Cellosolve	7	0
Methyl Chloroform	14	0
2-Methoxy Ethanol	5	0
4-Methoxy-4-Methyl-Pentanone-2	11	0
Methylene Bis Diphenyl Diisocyanate	19	0
Methyl Ethyl Ketone	37	0
Methyl Isobutyl Ketone	39	0
Mineral Spirits	10	0
Mono Methyl Amine	7	0
Mono Methyl Ether Acetate	4	0
Naphtha	35	0
Nickel	24	0
Nitrogen Dioxide	1	0
2-Nitropropane	4	0



AIR SAMPLES COLLECTED2. CHEMICALS (cont.)

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Organic Vapor, I.O.C	8	0
Ozone	5	3
Perchloroethylene	4	0
Rosin Core	3	0
Selenium	4	0
Silver	13	12
Sulfur Dioxide	6	0
Styrene	11	0
Tetrahydrofuran	5	0
Tin	5	0
Toluene	29	0
Toluene Diisocyanate	16	3
Trichloroethylene	6	0
Tungsten	5	0
Xylene	49	2
Zinc	23	0
Total	<u>1063</u>	<u>93</u>





LABORATORY WORK

<u>AIR SAMPLES</u>		1015
Chemical	1174	
Dusts	641	
<u>Material Samples</u>		302
Chemical	51	
Microscopic	208	
InfraRed	43	
<u>SHEAR SAMPLES</u>		5
Chemical	5	
<u>Urine Samples</u>		1874
Cadmium	36	
Hippuric Acid	109	
Lead	745	
Mercury	839	
Selenium	31	
Trichloroacetic Acid	64	
<u>Blood Tests</u>		1689
Lead	1689	
<u>Breath Tests</u>		10
Carbon Monoxide	10	
<u>Proficiency Analytical Testing Program</u>		112
Asbestos	24	
Cadmium	20	
Lead	24	
Solvents	24	
Zinc	20	
	TOTAL	5807



PUBLICATIONS

1. Recommended Safe Practices, Respiratory Protection Data Sheet No. 27, "Chemical Cartridge Respirators--Paints, Lacquers, Enamels." Bulletin, 2 pp.
2. Recommended Safe Practices, Respiratory Protection Data Sheet No. 1, "Self-Contained Breathing Apparatus." Bulletin, August 1977, 2 pp.
3. Recommended Safe Practices, Nursing Data Sheet No. 13, "Services Available for Health and Educational Materials." Bulletin, August, 1977, 2 pp.
4. Recommended Safe Practices, Respiratory Protection Data Sheet No. 24, "Dispersoid Respirators--Highly Toxic Dusts." Bulletin, August, 1977, 1 p.
5. Recommended Safe Practices, Ventilation Data Sheet No. 19, "Pouring Station." Bulletin, February 1978, 1 p.
6. Recommended Safe Practices, Respiratory Protection Data Sheet No. 6, "Carbon Monoxide Gas Masks." Bulletin, August 1977, 1 p.
7. Recommended Safe Practices, Chemical Data Sheet No. 8, "Ammonia." Bulletin, August 1977, 2 pp.
8. Recommended Safe Practices, Chemical Data Sheet No. 36, "Ozone." Bulletin, September 1977, 1 p.
9. Recommended Safe Practices, Nursing Data Sheet No. 5, "Hearing Conservation." Bulletin, July 1977, 1 p.
10. Recommended Safe Practices, Nursing Data Sheet No. 12, "Information on Drug Control." Bulletin, September 1977, 3 pp.
11. "Reference Library." Bulletin, July 1977, 2 pp.
12. Recommended Safe Practices, Nursing Data Sheet No. 14, "Guidelines for Informing Employees of Medical and/or Laboratory Findings." Bulletin, August 1977, 1 p.
13. Recommended Safe Practices, Respiratory Protection Data Sheet, No. 22, "Massachusetts Sales Representatives." Bulletin, August 1977, 2 pp.
14. Recommended Safe Practices, Physical Data Sheet No. 6, "Excessive Heat." Bulletin, January 1978, 3 pp.
15. "The Death of Frank." Occupational Health Nursing, October 1977, 2 pp.
16. Recommended Safe Practices, Chemical Data Sheet No. 14, "Lead." Bulletin, December 1977, 3 pp.
17. Recommended Safe Practices, Respiratory Protection Data Sheet No. 28, "Dispersoid Respirators--Asbestos." Bulletin, April 1978, 1 p.
18. Recommended Safe Practices, Chemical Data Sheet No. 26, "Toluene." Bulletin, December 1977, 1 p.



PUBLICATIONS

19. Recommended Safe Practices, Respiratory Protection Data Sheet No. 29, "Dispersoid Respirators--Dusts, Fumes, Mists and Fibers." Bulletin, April 1978, 2 pp.
20. Recommended Safe Practices, Respiratory Protection Data Sheet No. 30, "Dispersoid Respirators--Pneumoconiosis and Fibrosis-Producing Dusts and Mists." Bulletin, April 1978, 1 p.
21. Recommended Safe Practices, Respiratory Protection Data Sheet No. 25, "Respiratory Protective Devices." Bulletin, April 1978, 3 pp.
22. "Recommended Safe Practice Bulletins Currently Available for Distribution." Bulletin, March 1978, 2 pp.
23. "Standard Operating Procedure for Removing Lead-Based Paint." Bulletin, April 1978, 2 pp.
24. Recommended Safe Practices, Mineral Data Sheet No. 5, "Talc." Bulletin, May 1978, 1 p.
25. Recommended Safe Practices, Chemical Data Sheet No. 27, "Perchloroethylene." Bulletin, June 1978, 2 pp.
26. Recommended Safe Practices, Chemical Data Sheet No. 7, "Trichloroethylene." Bulletin,









MASS-MA 13.1: 979

# The Commonwealth of Massachusetts

EDWARD J. KING, *Governor*

Executive Office of Economic Affairs  
George S. Karlots, *Secretary*

DEPARTMENT OF LABOR AND INDUSTRIES

WILLIAM M. SHIPPS, *Commissioner*

DIVISION OF OCCUPATIONAL HYGIENE

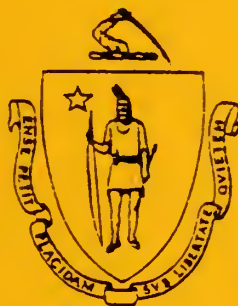
HAROLD BAVLEY, P.E., *Director*

GOVERNMENT DOCUMENTS

JUL 22 1980

PREVENTION

DETECTION



EVALUATION

CONTROL

## ANNUAL REPORT 1979

Originating Office



Department of Labor and Industries, Division of Occupational Hygiene

39 Boylston Street, Boston, Massachusetts 02116



ANNUAL REPORT  
OF THE  
DIVISION OF OCCUPATIONAL HYGIENE  
FISCAL YEAR 1979

This Annual Report records the program and activities of the Division of Occupational Hygiene of the Department of Labor and Industries for the fiscal year beginning July 1, 1978, and ending June 30, 1979.

The authority establishing the Division of Occupational Hygiene in the Department of Labor and Industries is contained in Chapter 331 of the General Laws, appearing in the Tercentary Edition, "AN ACT ESTABLISHING A DIVISION OF OCCUPATIONAL HYGIENE IN THE DEPARTMENT OF LABOR AND INDUSTRIES AND DEFINING ITS POWERS AND DUTIES.

Section 11A of this Act states, "In addition to such staff and facilities as may be necessary in the efficient performance of its duties, there shall be employed in the Division of Occupational Hygiene persons having special knowledge of the causes and prevention of occupational diseases. It shall be the duty of the Division to investigate conditions of occupation with reference to hazards to health and to determine the degree of such hazards, to investigate and evaluate methods for the control of such hazards, to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases, and, in cooperation with the Department of Public Health or otherwise, to promote occupational health and safety education.

PERSONNEL

Harold Bavley, B.S., P.E., Director  
Leonard D. Pagnotto, M.S., Assistant Director  
Lawrence J. Fine, M.D., Occupational Hygiene Physician  
Rexford G. Alexander, M.S., Chief of Engineering Services  
Frederick L. Schultz, B.S., Chief of Laboratory  
Robin J. Fogg, M.S., Senior Industrial Sanitary Engineer  
Frank R. Archibald, B.S. P.E., Industrial Radiation Control Supervisor  
Henry L. Smith, B.S., Senior Chemist  
Linda E. Tremblay, B.S., Senior Chemist  
Karen F. Irving, M.S., Senior Chemist  
Ellen J. Newlands, B.S., Assistant Industrial Hygiene Engineer



Elaine M. Krueger, M.S., Assistant Chemist  
 Fred Cohen, B.S., Assistant Chemist  
 Edward C. Allen, B.S., Assistant Chemist  
 Kin Ho, B.S., Junior Chemist  
 Bernice Linde, B.S., Administrative Assistant  
 Mary S. Chin-Lim, Senior Library Assistant  
 A. Rae Yudis, Senior Clerk-Stenographer  
 Olga V. Stripinis, Senior Clerk-Stenographer  
 Mary M. Fitzsimmons, Head Clerk  
 Joan M. Bando, Senior Clerk-Typist

The following personnel changes occurred during Fiscal, 1979:

Dr. David H. Wegman, Occupational Hygiene Physician, resigned to undertake full time duties as Associate Professor at the Harvard School of Public Health. His duties with this Division were assumed by Lawrence J. Fine, M.D., on a part-time basis. Dr. Fine is associated with the Harvard School of Public Health.

Rexford G. Alexander, Senior Engineer was promoted on April 29, 1979, to Chief of Engineering Services. He will be in charge of the 7(c)(1) On-Site Consultation Program sponsored by the U.S. Dept. of Labor (OSHA).

Erwin Allen, Asst. Industrial Hygiene Engineer was promoted to Senior Chemist on December 18, 1978, and will continue as a Health Consultant for the 7(c)(1) On-Site Consultation Program.

Linda E. Tremblay, Assistant Chemist was promoted to Senior Chemist as of February 11, 1979.

Elaine M. Krueger was promoted on February 13, 1979, from Junior Chemist to the Assistant Chemist position vacated by Linda M. Tremblay.

Robin J. Fogg, formerly with Arthur D. Little, Inc., Cambridge, accepted the D.O.H. position of Senior Industrial Sanitary Engineer on July 30, 1978.

Karen Irving, formerly Asst. Industrial Hygiene Engineer with the Asbestos Commission Program was promoted to Senior Chemist with the







GENERAL ACTIVITIES

The Division offices and laboratory remained in its rented quarters on the ninth floor at 39 Boylston Street, Boston. The Division occupies approximately 6150 square feet at this location. There is overcrowding with a need for 2000 sq. ft. of additional office space.

A total of 1400 services were undertaken including 571 in-state requests, and 51 out-of-state requests for information on matters pertaining to occupational health were answered. These services required a total of 1387 plant visits, 299 visits to other agencies, and 39 talks and lectures by the Division staff. This is an increase over 1978 of approximately 27% for plant visits and an increase of 8% for other field visits.

Field studies involved 7726 measurements of environmental conditions and the collection and analysis of 887 chemical and 745 dust air samples in places of employment. In addition, the laboratory evaluations included the analysis of 2067 air samples, 1294 urine samples, and 507 material samples, 1924 blood samples, 10 breath samples, and 15 smear samples. The Division participated in the proficiency analysis (PAT) program of the National Institute of Safety and Health, U.S. Department of Health, Education and Welfare, and analyzed 120 simulated air samples for asbestos, lead, cadmium, zinc and solvents; with West Allis Memorial Hospital for 12 blood samples, and the proficiency testing program with the Center for Disease Control, Atlanta, Georgia, for 3 blood samples.

The plant studies and visits resulted in more than 1815 recommendations potentially affecting more than 77, 135 workers.

The Massachusetts Department of Labor and Industries continued the 7(c)(1) On-Site Consultation Program sponsored by the U.S. Dept.



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of Labor, Occupational Safety and Health Administration, (OSHA), which provides on-site consultations in health and safety matters at the employers' requests. Under this contract, three staff members (two engineers and a chemist) of this Division provided this service to industries. The program was designed to encourage voluntary compliance. The Health Consultants after the plant or hazard survey for the evaluation of the potential health hazards provided the employers with a list of apparent OSHA violations and submitted recommendations for the corrections of the deficiencies encountered at the time of the on-site consultation visit.

The 7(c)(1) On-Site Consultation Program was funded on a 90%-10% grant basis. Approximately 115 consultative visits were completed during Fiscal, 1977. There was only one staff member on this program until April, 1979, at which time two additional Health Consultants were added to the program. The two new Health Consultants attended two weeks of training at the University of Alabama, Tuscaloosa, Alabama, in the various aspects and methods of investigation of plant hazards.

#### ASBESTOS EXPOSURE IN MASSACHUSETTS PUBLIC SCHOOLS--A PROGRESS REPORT

This progress report outlines the new developments and major activities of the D.O.H. staff on contract for the Asbestos Commission Program. The survey of public schools in Massachusetts has been completed and a pilot research program concerning the use and control of asbestos in public buildings has been undertaken.

#### Walk-Through Surveys

A total of 1,432 walk-through surveys of the public schools in Massachusetts have been completed. The Division of Industrial Safety Inspectors have sent a total of 1,300 walk-through surveys to the Asbestos Commission Program staff members at the Division of Occupational Hygiene office; the remaining 132 schools were surveyed by





the "Asbestos Commission Staff."

Since the February 28 report was issued, the "Asbestos Commission Staff" has processed 118 survey forms. Of these, 78 schools were surveyed by the Division of Industrial Safety Inspectors, and the remaining 40 walk-through surveys were completed by the "Asbestos Commission Staff." District walk-through survey information is listed below:

Table I

Completed WalkThrough Surveys by District

<u>District</u>	<u>Surveyed</u>	<u>Not Surveyed</u>	<u>% Schools Surveyed</u>
North Andover (A)	219	0	100%
Boston (B)	549	0	100%
Fall River (F)	181	0	100%
Pittsfield (P)	53	0	100%
Springfield (S)	182	0	100%
Worcester (W)	226	0	100%
Institutional (I)	11	0	100%
	<hr/> 1,432	<hr/> 0	<hr/> 100%

Bulk Sample Analysis

Each bulk sample of spray-on construction material is subjected to at least two analytical tests to determine if it contains asbestos. During the past four months, staff members completed the following analytical tests:

1. Phase Contrast Microscopy

The morphology of the constituents of 31 bulk samples have been studied to determine the appropriate follow-up procedure.





## 2. Electron Microscopy with Selected Area Electron Diffraction

Transmission electron microscopy (TEM), the most definite and time-consuming technique was used to identify 132 bulk samples. This group of samples included new school samples, further analysis of previously analyzed samples for verification, and samples from state buildings other than schools.

A total of 178 of the 1,432 target schools have been positively identified as containing asbestos. The findings are categorized by district below:

Table II

### Target Schools Containing Asbestos by District

<u>District</u>	<u>Number of Schools with Asbestos</u>
North Andover	35
Boston	73
Fall River	8
Pittsfield	6
Springfield	14
Worcester	39
Institutional Schools	3
TOTAL	<u>178</u>

Of all of the schools surveyed by the Special Legislative Commission on Asbestos, (all public schools built or renovated between 1946 and 1973) it was found that 12.4% of the total contained a spray-on material with asbestos.

### Air Sampling

Air samples have been and will continue to be collected in every public school containing spray-on asbestos material. These will



be taken in schools that must be resurveyed as well as those undergoing renovations correcting existing asbestos problems.

Air samples are collected onto a 37 MM Millipore Filter with a 0.8 um pore size over a four hour, high activity period using a Gast Vacuum Pump at a rate of 10 liters per minute. The filter was then analyzed under a phase contrast microscope using the standard NIOSH procedure for determining asbestos concentrations in the air.

The results of the high volume samples represent the average daily asbestos exposure to students. The high fiber concentrations generated by impact with the asbestos surfaces are not reflected in these results.

Due to the limitations of the air sampling methods, recommendations for asbestos controls are generally based on the condition, location, and friability of the asbestos material, and not the air sampling results.

Since the D.O.H.'s report of February 28, to the Asbestos Commission was issued, 167 additional air samples have been collected for the 178 schools that were air sampled.

Table III

Target Schools Air Samples by District

<u>District</u>	<u>Number of Schools Air Sampled</u>
North Andover	35
Boston	73
Fall River	8
Pittsfield	6
Springfield	14
Worcester	39
Institutional Schools	3
TOTAL	178



In addition to the routine air sampling conducted, several samples were taken under somewhat different conditions. The "Asbestos Commission Staff" received requests to give on-site technical advice and to monitor exposure levels during asbestos removal and encapsulation processes at two action schools.

The removal job at Martha's Vineyard Regional High School was undertaken using a "Super Sucker" truck manufactured by Super Products. The truck's compressor has a capacity of 1,600 cubic feet per minute, which was enough power to obtain complete capture of the asbestos material as it was being removed. This kept the dust levels within the work area very low.

The entire removal job, which was performed during the middle of the school year, took only three weeks for completion. The total cost, including cleaning of the contaminated books and school furnishing, removal, disposal, general clean-up, and replacing all electrical fixtures was about \$6.00 per square foot.

The removal and encapsulation job undertaken at Lunenburg High School involved the removal of the ceiling in the boys' locker room and encapsulation of the cafeteria ceiling. The job was completed in one week at a total cost of \$5,500. Encapsulation cost was less than \$1.00 per square foot, and the removal portion was calculated as approximately \$2.00/square foot.

#### Institutional Schools

In December, the Department of Mental Health requested that the eleven institutional school complexes in the state also be surveyed for asbestos content. All eleven schools have been surveyed and air samples taken where necessary.





Presently, the Massachusetts Bureau of Building Construction, under the direction of Mr. Edward McAdam, is involved in a massive renovation project to bring all of the institutional school buildings into conformity with the "Life Safety Codes." Asbestos control work can be funded under this project if recommendations are forthcoming in time to be included in BBC contracts.

#### Public Information Services and Asbestos Control Consultation

On March 29, 1979, the Asbestos Commission informed the school committees, superintendent, senators, representatives, and local boards of health of potential hazards in the twelve new action schools that the Asbestos Commission discussed at the February 28 meeting. Requests for information and technical assistance are still being received for both past and present action schools that are working toward the correction of the asbestos problems.

In addition to assisting the schools and their representatives directly, the "Asbestos Commission Staff" is still involved in giving technical information to agencies which can aid the project indirectly. Recently, the Environmental Protection Agency has established a comprehensive national program to evaluate and control the possible health hazards associated with asbestos. Essentially, the job has already been completed for the public schools in Massachusetts by the Commission. Therefore, the "Asbestos Commission Staff" has been working with the Environmental Protection Agency to organize the mass mailing of the federal documents to the school superintendents in Massachusetts, and assist schools in filling out the EPA survey sheets contained within the document.

The Asbestos Commission has also met with the Massachusetts



Teachers Association and its legal counsel to advise the Teacher's Union of the potential health hazards involved in public schools and to indicate what the risks are. The MTA is currently engaged in informing its members of the Asbestos Commission's results and urging asbestos controls be instituted in schools where the Commission has recommended action.

#### Recommendations for Further Work on Public Schools

1. Initiate a resurvey program for those schools which were classified as needing periodic review. Also resurvey action schools to see if controls were implemented.
2. Initiate a program to identify schools that have been found to contain friable asbestos so that the records will not be lost through the turnover in school personnel. The Asbestos Commission's information could be attached to the school's building file, and/or the Commission could design a hazard symbol for asbestos to be posted on-site until the material was removed.
3. Have asbestos related work placed on the Department of Labor and Industries list for jobs that cannot be done by persons under eighteen years of age (hazardous occupations.)
4. Refine the Ferris Index to conform with the hazard rating index used in the EPA guidance document to avoid confusing local officials with different sets of evaluations for the same areas.

#### Public Buildings

The Asbestos Commission was originally mandated to investigate the use and control of asbestos spray-on material in public schools and public buildings. Due to inadequate funding during the first two years of the project, efforts were concentrated on surveying the public schools.



Now that the "Asbestos Commission Staff" has finished assessing all of the target schools in Massachusetts, research has begun into the use of asbestos in public buildings.

First, a definition of "public buildings" is necessary to determine the scope of the work to be undertaken in the upcoming year. Buildings which are privately owned, but maintain public access (airport terminals, hospitals, banks, stores, nursing homes, etc.) are legally defined as public. To date, several private facilities have requested assistance from the Division of Occupational Hygiene for asbestos analysis and control, and the Asbestos Commission's public exposure criteria have been applied to buildings with public access. The second type of buildings of concern are those which are publicly owned and operated. The public buildings in Massachusetts are divided into three categories by owner:

- 1) State
- 2) Counties
- 3) Cities and Towns

Federal buildings are under federal jurisdiction, and as such should not be considered in a survey by a state commission.

#### State Buildings

The Commonwealth of Massachusetts maintains a complete list of all the buildings under its jurisdiction in the office of Administration and Finance at the State House. There are approximately 4,000 state buildings divided among thirteen state agencies. The list of agencies with property under their control is available at D.O.H. for review.

Although the date of construction, square footage, location, and type of frame construction are listed for each state building, it is not possible to determine from the list if the older buildings were





reconstructed or renovated in the asbestos target years. According to the dates of construction, approximately  $1/3 - 1/2$  of the 4,000 buildings are within the target years; the proportion varies greatly from agency to agency.

Several categories of building use lend themselves to long terms of residence and/or exposure to susceptible populations. Uses include hospitals, soldiers' homes, mental health centers, prisons, and detention centers. Other state facilities serve a young population such as the state college system, the MCD recreational facilities, and the industrial schools and treatment centers of the Division of Youth Services. In addition, high chronic exposures to public employees may be anticipated in public garages.

#### Counties

County buildings generally include courts, schools, prisons, administrative offices, and chronic hospitals. There are fourteen counties in Massachusetts and the more populated counties average 15-20 buildings each. Jurisdiction and recordkeeping varies widely from county to county. For example, Suffolk County Buildings are administered by the City of Boston, and not Suffolk County, about half of Essex County Buildings are leased from the towns in which they are found. In general, construction information is not readily available at the county level.

#### Cities and Towns

There are 351 cities and towns in Massachusetts. The City of Boston has no central listing of the city's property because all its public building records are kept by the department using and maintaining these buildings. No estimate of the number of buildings was available. Other large cities in the area were contacted, and there is no





standardization of public building records. It is estimated that each city has 15 public buildings on the average. The number of town and city buildings then, is approximately five thousand. Common uses include libraries, town halls, fire stations and public works departments.

#### Pilot Survey

Pilot surveys were done in all the public buildings of Waltham, Somerville, and Foxboro for the purposes of gathering information on asbestos uses and estimating the feasible number of surveys per day. The results are as follows:

City	Total Number of Public Buildings Surveyed	# containing # containing asbestos pipe sprayed-on # built insulation material 1946 - 1973		
Waltham	22	12	0	5
Somerville	14	10	0	3
Foxboro	7	3	0	5
TOTALS	43	25	0	13

In all, 43 public buildings were surveyed in two days, and even though 13 were built in the target years, no sprayed-on material was found.

However, several buildings had damaged asbestos pipe lagging and boiler insulation. One library had converted the basement area into the children's reading room, and the asbestos pipe lagging was damaged, friable and accessible in that area.

#### Previous Analyses

A search of the asbestos samples analyzed for the Division of Occupational Hygiene over the past three years revealed that a substantial number of public buildings have asbestos or have requested assistance.



where asbestos may be present. These samples include both pipe lagging and sprayed-on material. Hospitals, especially, have submitted samples, and Northampton State Hospital, Danvers State Hospital, Lakeville State Hospital, as well as the U.S. V.A. Hospital in Northampton have all been found to contain asbestos. The City of Worcester has already appropriated 1/4 million dollars for asbestos control, and other towns are similarly concerned.

### Recommendations

1. The total estimated number of publicly owned and operated buildings is in excess of nine thousand. The number of privately owned, public access buildings has not been estimated, but is probably also quite large. In all, the "Asbestos Commission Staff" completed work on 1,400 target schools, with the Division of Industrial Safety inspectors doing the bulk of the initial surveys. The School Buildings Assistants Department provided excellent records on location, dates of construction, and renovation and administration personnel for all public schools.

Given the large number of public buildings, the paucity of reliable information and the lack of support services from the Division of Industrial Safety, privately owned buildings should not be included on the survey at this time, and a system of priorities must be set for inspection of the state, county, and local buildings.

2. In all, the Asbestos Commission staff air sampled 178 schools. In only two cases were the levels of airborne asbestos significant, and in both cases, damage to the ceiling material was extensive. In addition, low air sample results are sometimes confusing to local officials. They compare the readings to OSHA's 2 f/cc limit, and assume that, because



air samples do not exceed federal occupational standards, no problem exists, regardless of the condition of the asbestos material. Consequently, it is recommended that air samples be taken only in those public buildings where (1) damage is extensive and controls are potentially necessary (FI above 15) or (2) where it is requested by the administrator of the building.

Early in its history, the Asbestos Commission relied on mail surveys to superintendents to collect information and bulk samples from public schools. The Environmental Protection Agency has taken basically the same approach with its mass mailing of a two booklet instructional package to school superintendents throughout the country.

Approximately 27% of the superintendents responded to the Asbestos Commission survey, and of those who responded, 50% sent in information so inaccurate as to be essentially useless.

It would be possible for the "Asbestos Commission Staff" to write a guidance document to be sent to public buildings. Given the large percentage of public buildings built before 1946 or after 1973, a mailed survey might be the best way to eliminate the bulk of the public buildings. Also, asbestos pipe lagging, which is found in building regardless of year of construction, is easier to identify and control. If this were done, the staff could concentrate on buildings constructed in the target years without ignoring the possible asbestos exposure from pipe lagging.





ENGINEERING ACTIVITIES

EFFLUENT AND ENVIRONMENTAL SURVEILLANCE CONFERENCE

The Industrial Radiation Control Supervisor attended the ASTM sponsored conference on Effluent and Environmental Surveillance held at Johnson State College, Johnson, Vermont during July 9-14, 1978. The conference was attended by 126 representatives from industrial companies and government agencies. Approximately 50 different technical papers were presented during a period of nine, 4 hour sessions. The papers covered the following subjects:

- Environmental Impact of Radiopharmaceuticals
- Nuclear Facility Occupational Exposure Monitoring and Control
- Monitoring of Liquid and Airborne Effluents from Nuclear Facilities
- Environmental Monitoring of Nuclear Facilities
- Radioactive Waste Management and Control
- Quality Control and Quality Assurance
- Standards and Standardization

The conference was well organized and excellently conducted. Considerable use was made of visual aids. A question and answer period was held after each paper was presented. Attendance at the conference was adjudged as very worthwhile and beneficial, as well as instrumental in aiding attendees to keep abreast of current technology and developments.

Attendance at the conference did not require use of State funds. Conference fee and travel expenses are expected to be reimbursed by the New England Consortium on Environmental Protection.

ASBESTOS INVESTIGATION AT A COMMERCIAL BUILDING

Two workers for the building maintenance company at the First National Bank building complained about the asbestos exposure from the



spray-on insulation to their employer. Their employment was terminated subsequently. A sample of the material was brought to the Division for analysis by one of the men. The sample does contain asbestos; there will be a visit to the building shortly to evaluate the exposures to the maintenance staff.

#### LOWELL UNIVERSITY APPOINTS ADVISORY BOARD

The Division's Assistant Director has accepted the invitation to serve on the Lowell University Advisory Board for the Environmental Health Technology Program. The program which now includes medical technology will be extended to include industrial hygiene and environmental pollution. The committee will advise the University on matters concerning curricula and related areas as it pertains to this program.

#### UREA-FORMALDEHYDE INSULATION HAZARD PROMPTS SPECIAL MEETINGS

Representatives from Borden Co., National Association of Urea-Formaldehyde Insulation Manufacturers and State personnel of the Dept. of Consumer Affairs, Public Health and the Division of Occupational Hygiene met to discuss the health hazard due to formaldehyde, analytical air testing procedures, standards, other sources of formaldehydes in homes, in the ambient atmosphere, sensitization and the methods of application. In addition, discussions were held on (1) whether installation of UF foam would continue to be permitted in Massachusetts; (2) what type of regulations, if any, would apply to future installations; (3) what redress of existing complaints would be given by the industry; (4) what type of voluntary program would be recommended and instituted by the industry for handling the problems.



The Department of Public Health was willing to allow UF foam insulation to continue in Massachusetts pending the institution of guidelines within the industry.

The Division of Occupational Hygiene has performed the analytical work to date for the Department of Public Health for studies made in homes. The Division will air sample industrial installations where necessary.

#### OFFICE WORKERS' CONCERN OVER ASBESTOS HAZARD

The 9 to 5 Organization for women ~~clerical~~ office workers requested a meeting with Commissioner Roussos, Directors of the Division of Industrial Safety and Occupational Hygiene and their staffs to express their concern about the potential exposure of office personnel to asbestos. Asbestos was commonly sprayed on exposed steel beams in buildings erected between 1946 to 1973. The asbestos is visible above suspended ceilings. The use of asbestos for this purpose has largely been discontinued because medical studies have shown that asbestos is a potent lung carcinogen, particularly among smokers who are exposed to this material.

It was explained to members of this organization that under normal circumstances no significant exposure to asbestos occurs in offices. When the space above the ceiling tile is disturbed, however, the potential exposure increases with the degree of activity. Under these conditions, which occur when maintenance work or renovations are made, workers should exercise care in limiting the contamination that can occur. The Division of Occupational Hygiene has agreed to prepare a set of guidelines for workers required to do this work and prepare a news release for distribution to everyone concerned.





INDUSTRIAL BULLETIN #5 HEARING HELD

In accordance with the request of the Secretary of State's first, a second public hearing was held on the revisions and updating of Industrial Bulletin #5, which contains the Rules and Regulations for the protection of the health and safety of employees from occupational diseases caused by ionizing radiation. The last revision of these rules and regulations was on January 15, 1962.

TRI-SOCIETIES MEETING ON MICROWAVES

At a meeting sponsored by the N.E. Chapters of the American Industrial Hygiene Association, the Health Physics Society, and the American Society of Safety Engineers, the invited speaker, Paul Brodeur, an investigative reporter cited the U.S.S.R. standards on microwaves compared to those in this country. Also, he spoke on the alleged cover-up of the illnesses sustained by the personnel of the U.S. Embassy in Moscow from microwaves directed toward the embassy. Mr. Brodeur believes the U.S. standard of 10 milliwatts/cm<sup>2</sup> is much too high.

BUILDING OWNERS AND MANAGERS ADVISED ON ASBESTOS  
HAZARD.

The luncheon of the Building Owners and Managers Association was attended and a talk presented by our Senior Engineer on asbestos to the attendees. The talk outlined the Division activities, the OSHA consultation services, the Legislative Asbestos Commission work and the question of public exposure to asbestos, general information on asbestos and stressed the guidelines for control of asbestos exposure to the public and to the maintenance staff. About 35 members of the organization attended. Questions and comments at the end of the talk showed general interest and understanding of the control guidelines.





HARVARD STUDENTS PARTICIPATE IN THE ASBESTOS COMMISSION  
PROGRAM

The Division's Senior Project Engineer provided information to four students from the Harvard School of Public Health in the graduate program for Health Policy and Management who visited our office, to discuss the potential for their involvement in the Asbestos Commission work, which would be in conjunction with their class program.

The discussion involved the Legislative Commission program to date and the potential work and problems at this time. These problem areas are:

1. Extension of the program to Public Buildings, requiring action on the part of the legislature in continuing the funding.
2. The recommendations to the schools for future resurveys, again needing legislative action.
3. Monitoring the work action at the schools -- a money and staffing problem.
4. Technical assistance to specific schools where action is to be taken. This work must be done by the current staff.
5. Justification to Communities for the need to take action. Some school districts may want public meetings, and a fact program on the asbestos hazard.
6. Funding. Legislative action for financial assistance to effected school districts.

Apart from item 4 (which our staff must cope with) the other questions are available for their input. The students felt that they could develop a program for justification and a public relations program for the school districts.



HIGH SCHOOLS SHOW EXCESSIVE ASBESTOS CONTAMINATION

Two schools out of 111 schools air sampled have been found to have measurable levels of asbestos greater than 0.10 fibers per cubic centimeter. The Legislative Commission's guideline for public exposure is 0.04 fibers per cubic centimeter. The two schools are, Rockport High School and Martha's Vineyard Regional High School.

Rockport has taken corrective measures to alleviate this problem by enclosing and sealing the asbestos containing ceiling. A thorough clean-up followed to remove any dust from the floors and walls using water.

The Martha's Vineyard School Committee has closed their high school upon recommendation of the Special Legislative Commission of Asbestos. The School Committee is now working to correct this problem.

The Department of Labor & Industries recommended that the employees (i.e. teachers, administrative staff and maintenance workers) be given a physical examination in accordance with the requirements of the federal government's Occupational Safety and Health Administration (OSHA) for the private sector.

SEMINAR ON SCHOOL LABORATORY SAFETY

The Director of the Division of Occupational Hygiene and the Supervisor of Training of the Division of Industrial Safety attended a two-day seminar on "Safety in the School Laboratory", at the New England Center for Continuing Education at the University of New Hampshire, sponsored and funded by the National Institute for Safety and Health (NIOSH).

The topics of discussion included; the Legal Aspects, Personal Protective Equipment, Ventilation, Biochemical and Animal Hazards, Labeling and Recordkeeping, Procedures for Handling and Disposal of



Chemicals and Reagents, Laboratory Hardware, and an Industrial Hygiene Roundtable Workshop.

The seminar was attended by state industrial hygiene and safety personnel, as well as school science supervisors in the New England area.

#### ASBESTOS COMMISSION RECOMMENDS DRASTIC ACTION

An Asbestos Commission subcommittee meeting was held to discuss and decide on the corrective action recommendations to be sent to school districts with high Ferris Index (F.I. greater than 16) schools. Nine schools recently air sampled and evaluated by the Asbestos Commission Staff were the main topics of discussion. Two of these schools had air sampling results several times greater than the Commission's background level of 0.04 f/cc. It was decided to recommend the immediate closing and removal of the asbestos material at one of these schools; the other school had taken effective interim asbestos abatement measures.

At the full Asbestos Commission meeting, Rep. Lois Pines assured the members that every effort would be made to find a suitable replacement for the vacant House Chairman and Executive Director positions.

#### SCHOOL LABOR UNION ADVISED OF ASBESTOS HAZARD

The Director and one of the engineers met with business agents of several school labor unions to discuss the Legislative Asbestos Commission findings. The meeting was set up by Asst. Commissioner Snow for the purpose of informing the members of the unions of the findings of the Commission staff, and with what conditions their members should be concerned.







AN EPA SEMINAR ON ASBESTOS

Recently, the federal Environmental Protection Agency (EPA) has prepared a draft of its policy revisions dealing with the demolition and renovation of buildings containing asbestos. On January 10, the EPA hosted a seminar to discuss the asbestos health hazard in general: and the new demolition and renovation regulation in more detail. Interested Federal and State agencies were asked to participate, and OSHA, Mass. DOH, and the Air Pollution Control agencies from Mass., N.H. and Connecticut were represented.

Kenneth Maimberg from EPA outlined the basics of the new regulations as follows:

1. There shall be 0% visible emission of asbestos during renovation and demolition.
2. All friable asbestos-containing material must be stripped and properly disposed of before the demolition or renovation begins.
3. Safe work practices must be used for stripping, removing, and disposing of the friable asbestos material.
4. These regulations apply to all buildings of greater than 4 dwelling units, and where there is more than 80 meters of asbestos pipe lagging or more than 15 square meters of friable, asbestos material.
5. EPA is changing its regulations so that all friable material containing asbestos, even those with less than 1% asbestos by dry weight, are subject to these regulations.

Randy Rice, an EPA inspector, discussed personal safety for inspectors at a demolition/renovation work site. He suggested the following precautions:



1. Wear gloves, hard hats, steel-toed boots and respirator as appropriate.

2. Wet the sample before taking it.

3. Try to do inspections when work is not in progress.

The Director of Mass. Division of Occupational Hygiene spoke about the health effects of asbestos exposure, explained that inhalation of asbestos dust may cause a chronic lung disorder known as "asbestosis". In addition, asbestos is linked with lung cancer, and a rare malignancy of the pleural and peritoneal linings, known as "mesothelioma". He stressed that cigarette smoking has a synergistic effect with asbestos exposure and increased the risk by a factor of ten.

Later in the afternoon, an EPA lawyer discussed legal aspects of enforcing new regulations.

#### UNUSUAL HAZARD PROMPTS INVESTIGATION

Our Division investigated the source of foreign deposits on the inside surfaces of exterior windows in eight public schools recently insulated with National Cellulose K-13. According to the manufacturer, the product consists of newsprint impregnated with boric acid and aluminum sulfate. The adhesive used with K-13 is a nonionic acrylic water base emulsion. In preparation for the insulation, floor and walls were covered to confine the contamination from over-spray. The insulation was installed during the July - August school recess.

The problem appeared in January after the heating session began. An examination of the window deposit indicated that it contained boric acid and a binding agent which was suggestive of the acrylic adhesive.

Air tests for boric acid in the schools were negative indicating there was no active flow of this material from the insulation to the



room environment and windows.

It was concluded that the deposits on the windows were due mostly to the spray materials that escaped from the enclosure when the insulation was installed last summer. The deposits did not become noticeable however, until the heating season when moisture from the air was driven to the window surface and activated the emulsion.

A thorough washing of the windows must be done. Because of the nature of the deposit removal may be a long and difficult task.

#### CONFLICT OF TWO STATE DEPARTMENTS

The Division of Air and Hazardous Materials of the State Department of Environmental Quality Engineering is promulgating regulations of control of stationary sources of emissions from industrial establishments.

The Director of the Division of Occupational Hygiene appeared at the public hearing in behalf of the Department of Labor & Industries to protest a jurisdictional overlap.

The proposed regulations are allegedly based upon the most recent guidance provided by the U.S. Environmental Protection Agency. It is contemplated to not only control outside emissions from stationary sources but also in-plant emissions. According to the Section on "Solvent Metal Cleaning,". Due to the diversity of process variables associated with these operations, it has been determined that regulations reflecting equipment specifications and work practices would be superior to one reflecting specific emission limitations.

The hearing chairman was advised of the jurisdiction of the U.S. Department of Labor, OSHA and the Massachusetts Department of Labor and Industries, in controlling in-plant sources of emissions from





organic vapors and work practices.

The Director of DOH recommended that a preamble be included for the proposed regulations which should specify the joint interaction and the area of jurisdiction of the State Department of Labor and Industries.

#### MASSACHUSETTS SAFETY-COUNCIL MEETING

The Supervisor of the Division's Engineering Section presented a talk on asbestos health hazards at the Public Employees Session of the annual Massachusetts Safety Council meeting in Boston. The talk focused on the source of asbestos hazard in public buildings, the difference between occupational and public exposure standards and guidelines, the program of the Legislative Asbestos Commission, and the problems concerning the methods of control for asbestos spray-on coatings.

#### DOH ASSISTS PUBLIC HEALTH IN PUBLIC HEARING

The Director and the Assistant Director of the Division of Occupational Hygiene, at the request of the Deputy Commissioner of Public Health served alternately on a four member panel at the public hearing called to determine whether or not urea-formaldehyde foam insulation, used to insulate homes should be prohibited in Massachusetts.

This Division analyzed air samples taken by inspectors from Public Health's Food & Drug Division in approximately 100 homes.

The panel asked questions and listened to testimony presented by affected home owners, experts pro and con, and by members of the industry.

#### ENCAPSULATION TEST PROVES SUCCESSFUL

A year ago, a test application of an encapsulation paint for asbestos coatings was applied to a section of the 22nd floor of the Saltonstall Building. This coating had at the time the desired proper-





ties of flexibility, adherence, bridging, and sealing properties for the asbestos fireproofing on the structural steel. The surface was re-examined this month to evaluate the durability and the effects of a year's exposure. The coating remains flexible and shows no signs of deterioration. The encapsulating paint is a bridging type, so any breakdown would be evidenced by the appearance of the asbestos and/or fiberglass fibers of the fireproofing.

#### A SAFE METHOD FOR ASBESTOS REMOVAL

A meeting of interested parties met to review the asbestos removal job at the Martha's Vineyard Regional High School. People from the federal Environmental Protection Agency, the National Institute for Occupational Safety and Health, the state Department of Environmental Quality Engineering, and private architects and consultants were present. The contractor for the school removal job showed movies of the removal work and discussed the work done at the school. Of primary interest was the use by the contractor of a Supersucker, a large truck based wet vacuum system. The removal was done using vacuum hoses at the scraper to transport the asbestos material from the wall into the truck tank outside the school building. Final cleaning utilized the vacuum system to suck up the jet stream of water used to flush down all surfaces of the building. The fiber counts during the actual work were below the Federal standard of 2 fibers/ml of air. This is in contrast to another removal job performed by a contractor using a different method of removal wherein the fiber counts were up to 100 fibers/ml of air.

#### MYSTERIOUS HEALTH HAZARD AFFECTS WOMEN IN OFFICE

Four women office workers suddenly developed face and body rashes. Along with this they reported irregularities in their menstrual cycles.



Coincident with the health problems was the appearance of a strong, unidentified odor.

The odor has disappeared and the health problems have subsided. A direct connection between the two occurrences has not been confirmed, but it was noted that the Gas Company was making repairs in front of the building. The air-intake for the ventilation system is located to the rear of the building, but it was found that air currents are such that air from the street and a parking lot nearby easily finds its way into the office ventilation system.

No definite conclusions have been drawn from the investigation but the problem is still under investigation.

#### OSHA ON-SITE CONSULTATION COURSE

Our Chief of Engineering Services attended a two week course for on-site consultation. The course is given by the University of Alabama under a contract with the U.S. Department of Labor to provide training for the Health and Safety Consultants for the OSHA consultation program. The course is directed at providing the basics for good communication between a consultant and a client, and providing a thorough understanding of the consultation program as spelled out in 29 CFR 1908.

#### AMERICAN INDUSTRIAL HYGIENE CONFERENCE

The Director of the Division of Occupational Hygiene and one of the Health Consultants for the OSHA On-Site Consultation Program 7(c)(1) attended the American Industrial Hygiene Association Conference from May 27 - June 1, at the Palmer House in Chicago, Illinois.

This six-day, annual, joint conference, co-sponsored by the American Industrial Hygiene Association and the American Conference of Governmental Industrial Hygienists, was attended by over 4,200 Indus-





trial hygiene specialists from the United States and many foreign nations.

During the conference, over 300 scientific papers were delivered. One of these papers, "Asbestos Exposures in Massachusetts Public Schools" was presented by our staff health consultant.

#### STAFF ATTENDS SPECIAL NOISE SEMINAR

This noise seminar involved a brief introduction of the fundamentals of sound, its properties and measurement. The regulatory requirements and associated measurements for occupational noise exposure were presented and discussed. Several modern digital sound measuring instruments were introduced and their correct employment contributing to the hearing conservation effort was demonstrated. Application of these instruments to environmental noise measurement were also discussed.

Seminar participants were given the opportunity to use the instrumentation presented in trial time history dosimetry, statistical distribution analysis and noise exposure monitoring studies.

#### U.S. ENVIRONMENTAL PROTECTION AGENCY PRESENTS ASBESTOS SEMINAR

The Environmental Protection Agency, Region I, held an all-day seminar, "Sprayed-Asbestos Hazard Evaluation in Schools," at the Regional laboratory in Lexington. The Massachusetts Special Legislative Commission and the Massachusetts Division of Occupational Hygiene, were invited to attend the meeting, along with other private, federal and State personnel with an interest in asbestos hazard abatement.

A short film was shown which briefly explained the hazards of low-level asbestos exposure, the uses of friable asbestos in schools, and identified ways to evaluate and control potential asbestos health





hazards. A copy of the film was given to the Asbestos Commission to add to its resource library.

Dr. Robert Sawyer, Yale University School of Medicine, is currently assisting the EPA in its development of a national program to identify and control asbestos hazards in schools. He discussed inspection and sampling methods for sprayed asbestos-containing material, objective hazard evaluation, and corrective actions such as, removal and enclosure.

EPA representative John Smith, based in Washington, D.C., discussed several methods of bulk sample and air analysis, and explained the quality assurance measures necessary in asbestos analysis.

#### ENGINEERS MEET WITH PENN STATE EDUCATORS

The Director, the Chief of Engineering Services of this Division, and several engineers from other state agencies met with educators from the College of Engineering, of the Pennsylvania State University, who are engaged in a research project sponsored by the National Science Foundation, to discuss the problem of continuing education of engineers.

The problem involved in updating of engineering training, organizational factors, individual factors, and technical communications were discussed by the group. A series of questionnaires on the pertinent material reviewed were completed at this meeting by the engineers participating in the seminar.

#### REPORT ON THE SCHOOL ASBESTOS PROBLEM

The Division of Occupational Hygiene's Asbestos Program Staff reported to the Legislative Asbestos Commission the present program mandating the investigation of the use of asbestos fire proofing sprayed-on material in public schools in Massachusetts, has been completed. A



total of 1432 target school walk-through surveys has revealed that 178 schools (12.4%) have been identified as having asbestos sprayed-on material. All of these schools have been air sampled and categorized as to potential health hazards.

#### EXPERT TALKS ON ASBESTOS IDENTIFICATION

Several of the Division's technical staff attended the dinner meeting of the New England Section, American Industrial Hygiene Association to hear Dr. Charles Spooner of GCA Corp., Bedford, MA, discuss the problem of asbestos and the various methods of identification and quantification of this hazardous material. Dr. Spooner emphasized the importance of correct identification. He described the advantages and disadvantages of several methods, stressing the use of the electron microscope, polarizing light microscope and dispersion staining.

Our Asbestos Program staff uses the transmitting electron microscope and specific area electron diffraction along with a newly developed method using the infrared spectrophotometer. Quantification of air samples after identification is performed with the phase contrast microscope.

#### CHEMICAL ACTIVITIES

##### THE UREA FORMALDEHYDE INSULATION PROBLEM

The national interest in energy conservation has prompted many homeowners to insulate their homes to save on fuel costs. They unfortunately received more than they bargained for.

Many of these homeowners have reported health effects in themselves and their families occurring shortly after the homes were insulated. Chief complaints are irritation of the eyes and nose and throat, but nausea, headache, sinus swelling and sneezing have also been reported.



These effects have also been reported by workers in business establishments where foam insulation was used.

The insulation in question is urea formaldehyde. It is introduced into walls as a foam which is prepared on the site from a liquid solution of urea formaldehyde and an acid catalyst. If the foam is not properly prepared, it is unstable and deteriorates with the release of formaldehyde which is a strong irritant. Such has been the case in a number of homes, and homeowners have sought assistance from the Department of Public Health to relieve them of this problem.

Our agency has joined in a cooperative effort in studying this problem. Air sampling in homes has been carried out by the Department of Public Health and the Division of Occupational Hygiene has provided the analytical expertise.

To date 75 tests have been performed and formaldehyde levels ranging up to 2.6 ppm have been reported. To appreciate the significance of these findings one needs only to remember that the current industrial standard is 2.0 ppm, but NIOSH believes that it should be lowered to at least 1ppm, and reports that health effects have also been reported in some individuals in the range of 0.5 to 1.0ppm.

Several meetings were held in the Attorney General's Office with our agency, Public Health Department, Office of Consumer Affairs, and members of the insulation industry in attendance to determine what course of action should be taken. No definite strategy has emerged as yet, but the Federal Department of Energy (DOE) is expected to fund a study of an additional 500 homes to more fully assess the formaldehyde exposure problem. Our Division may be contracted to perform in laboratory analyses. This phase of the DOE program may be followed by an expanded





one of surveillance also funded by DOE.

#### PHOSPHINE EXPOSURE AT SEA

Children's Hospital Poison Center telephoned our Division for information on exposure to phosphine. It appears that a Greek vessel at sea carrying wheat used aluminum phosphide to disinfect its cargo. Upon contact with moisture this material breaks down to phosphine gas which exerts a disinfectant action. The reaction is controlled ordinarily by the limited amount of water in the air. In this instance, direct contact occurred with sea water which produced an acute exposure to members of the crew. Eleven members of the crew complained of nausea. The captain's daughter was flown to Logan International Airport, Boston, and then transferred to Children's Hospital where she died upon arrival. The use of aluminum phosphide is now rarely used in this country for disinfecting grain because of its toxicity. The phosphine that is produced can generate dyspnea, weakness, vertigo, bronchitis, edema, convulsions, liver problems and death can occur if the exposure is severe enough.

#### VENTILATION AND AIR POLLUTION CONFERENCE

Our Assistant Chemist participated in the 11th Annual Industrial Ventilation and Air Pollution Conference held at the University of Connecticut at Storrs. This week long course included speakers on subjects of practical duct design, air cleaning devices, recirculation and make-up air, fan selection, air measurement, etc. Approximately fifteen hours were spent on classroom design problems calculating the static pressures for specific industrial operations.





INSTRUMENTATION TRAINING COURSE

Two days of intensive training for our chemist at the Perkin-Elmer Company, corporate headquarters in Norwalk Connecticut, were provided by the supplier of the Division's new gas chromatographic unit. Topics included, development and theory of gas chromatography, the maintenance of the instruments injection and detection systems, and special applications. Gas chromatography is the analytical method of quantitating chemical levels in the atmosphere in the parts per million range.

SERIOUS CHEMICAL ACCIDENT INVESTIGATED

This Division and the Division of Industrial Safety recently investigated a serious industrial accident involving overwhelming chemical exposure at a Massachusetts pharmaceutical company engaged in the production of the anaesthetic Xylocaine. The sole operator of the 200 gallon reaction vessel used in the initial production step had nearly completed the addition of benzene, xylidene, sodium carbonate solution and chloroacetyl chloride to the mixing tank when it erupted, spewing at least two-thirds of its contents into the work area and drenching the employee. Within one minute co-workers had put the person under a deluge shower and had begun stripping him of his contaminated clothing when he suffered his first cardiac arrest. Cardio-pulmonary massage was immediately undertaken and breathing resumed within three minutes. The company nurse, who had arrived at the area within two minutes, had called for an ambulance which arrived in approximately five minutes. Two emergency medical technicians entered the area and removed the person who, it is reported, suffered two more cardiac arrests before his condition was stabilized at a nearby hospital. Four weeks following the accident the employee remained in a coma.



Other employees who were in the area at the time of the accident were admitted to area cardiac intensive care units to be monitored for twenty-four hours as a precaution. The reason this precaution was taken is that one of the breakdown products which is generated when chloroacetyl chloride comes in contact with water is monochloroacetic acid which can act as a cardiac toxin, although the exact mechanisms by which this occurs are unknown.

Because of the mixed nature of these exposures, it is impossible to attribute the symptoms found to any specific chemical. The cause of this accident was believed to be inadequate mixing during the addition of the chloroacetyl chloride.

Recommendations have been made by this Division for installing safety devices on the mixing tank in order to prevent such accidents from recurring.

#### EXCESSIVE SULFUR DIOXIDE EXPOSURE

Our Division was called to investigate reports of headache, dry throats and nausea by boiler room personnel. The problem became noticeable shortly after a new roof and two ceiling exhaust fans were installed, but serious effects did not occur until cold weather caused windows and doors to be closed.

Tests in the boiler room were negative for hydrogen sulfide and carbon monoxide, but sulfur dioxide concentrations were slightly above 5PPM (TLV 5PPM) in front of the boilers and 10 PPM behind them. The sulfur dioxide was produced from the combustion of sulfurized oil. Leaks in the boilers allowed the gas and other combustion productions to escape into the boiler room. A blue haze, in fact, was observed hanging above the boilers.





Ventilation on the boilers coupled with that provided by the ceiling fan permitted at least one air change per minute in the boiler room. The problem, however, was that there was no make-up air.

When the top windows facing the boilers were opened, the blue haze rapidly disappeared. Tests showed that the sulfur dioxide levels were reduced to well below 1 ppm.

It was recommended that the windows be kept open or a mechanical make-up air system provided.

#### CLEAN-UP OF WASTE CHEMICAL DISPOSAL SITE

The Division investigated the status of the clean-up of an abandoned chemical waste disposal site. It was learned that clean-up crews arrived on the site on December 4, 1978. The chemical waste was qualitatively classified and is being treated accordingly. All solids are loaded on box trailers and shipped to a sanitary land fill site in Niagara Falls, N.Y. Barrels containing liquids are transferred by vacuum into tank trailers and subsequently to large holding tanks. After settling, the water layer is loaded into tank trucks and taken to Niagara Falls for waste treatment. Fuel material is sent to a waste disposal company in Braintree where it is incinerated.

Workers are provided with respiratory equipment and recommendations made by our Division earlier for the health and safety of the workers appear to be carried out. About 1/10 of the chemicals from the original inventory of 1,000,000 pounds has been processed. It is expected that the work will go faster now that the operation is organized and the job should be completed in 2-3 months before the warm weather arrives.





VANDALS CONTAMINATE SCHOOL WITH MERCURY

A vial of metallic mercury was maliciously smashed against the stairwell wall of a local high school. When the mercury droplets were discovered on the stairs, the Division of Occupational Hygiene was called to assist in evaluating and controlling the problem.

Tests by the Division showed that mercury concentrations in the stairwell were in excess of the industrial Threshold Limit Value (TLV) ( $0.05 \text{ mg/m}^3$ ) and there was evidence that the airborne contamination was being tracked to other parts of the building. Through the Division's efforts, a professional decontamination crew was mobilized. Further assistance was obtained from the Sylvania Electric Company who generously provided a special vacuum cleaner and clean-up chemicals. The clean-up took several hours and was completed by 2:00 a.m. in the morning and a member of the Division's staff was on hand to monitor the air and ascertain that mercury contamination was satisfactorily removed from the school.

DIVISION PUBLISHES BENZENE EXPOSURE DATA

The Division published a paper based on its experience with benzene that supports the view that an environmental standard of 10 PPM provides adequate protection to workers exposed to this solvent. Benzene is a chemical that affects the bone marrow and is reputed to produce leukemia.

The paper which appears in the February issue of the American Industrial Hygiene Association Journal describes medical and environmental surveillance performed by the Division since 1960. The health and employment status of 38 workers who were employed and exposed to



benzene for 1 to 24 years are presented. No evidence of leukemia was found and it was concluded that a standard of 10PPM for benzene was safe. It is worthy to note that NIOSH and OSHA who earlier proposed that the standard be set at 1PPM have recently decided to adopt a standard of 10PPM for benzene.

#### OXYGEN BREATHING MASK SAVES FIREMEN

A fire at a local electronics firm was cause for concern when it was reported by the company nurse that perfluoroisobutylene was one of the chemicals suspected of having been released during this fire. This compound is an extremely toxic respiratory irritant which has caused death within two to six hours to laboratory rats and mice at airborne concentrations of less than 2ppm.

When the toxicology department of the company which manufactures this product was contacted, it was determined that the chemical in question was actually a polytetrafluoroethylene, an inert, nonflammable compound. According to tests done by the manufacturer, perfluoroisobutylene is released as a thermal decomposition product. The firemen, who would have been the only persons potentially exposed during high heat conditions, were fortunately wearing self-contained breathing apparatus.

#### CHEMICAL SPILL ENDANGERS WORKERS AND DOH STAFF

Heavy toluene diisocyanate (TDI) exposures were incurred by plant employees and DOH Division personnel on hand when an accidental spill occurred in a urethane foam manufacturing plant. The cause of the spill was a bad valve on a storage tank. TDI exposures were as high as 0.136 ppm about 20 times the allowable limit. Corrective measures and clean-up procedures were recommended by our personnel and these



were carried out immediately.

#### SEWER SYSTEM PRESENTS CHEMICAL HAZARDS

Our Division investigated a complaint of chemical odor in a city sewer system being repaired by a construction firm. Our tests showed at least one sewer contained 100-200 ppm of xylene and additional amounts of other solvents. The source of the solvents is believed to be manufacturing plants in the area illegally using the sewer to dump their chemicals. The contractor was cautioned as to the potential hazards.

Recommendations were submitted for adequate protection and ventilation for subsequent entry into the sewer system.

#### WELL GASES RENDER DUO UNCONSCIOUS

The Division investigated a report that a father and son were found unconscious at the bottom of a 14 foot well. Because of the urgency of the matter a State Police helicopter transported a member of the chemical staff to the site of the accident.

It appears that the father climbed down the well to shut off a water valve and within a few seconds he was rendered unconscious. His son attempted to rescue him and he too lost consciousness. A rescue team was then called which removed both victims from the well in 20-25 minutes. Both individuals were taken to the Cape Cod Hospital where they remain in a comatous condition with indication of brain damage. Both employees died.

Tests in the water vault where the victims were found indicated the following: Methane - 3-5%; Carbon Dioxide - 9-10%; Oxygen - 5%; no hydrogen sulfide, and less than 2 ppm of carbon monoxide.

Carbon dioxide which is normally 0.03% was increased markedly by





bacterial oxidation and reduced oxygen content to a level that would cause unconsciousness in a matter of seconds. Methane concentration was also elevated and bordered the lower explosive limit (5%). This gas was generated also by the bacterial activity in the landfill around the well.

Recommendations for purging the well with fresh air and the relocation of the shut-off valve so that entry into the well would be eliminated were made to prevent recurrence of this type of accident.

#### STUDENT DIES IN CHEMICAL LABORATORY EXPLOSION

The Division investigated a chemical laboratory explosion which caused the death of a female graduate student at a State University.

Between 12 and 1 p.m., the student and her professor disconnected a 2 liter flask from a distillation system and transferred it to a laboratory hood. The flask contained a suspension of lithium aluminum hydride (LAH) in tetrahydrofuran (THF). The professor left the laboratory at 1 p.m. and the student was left with adding some THF to the flask and destroying the LAH by carefully adding ethyl acetate which she had done several times before.

Fifteen minutes later, at 1:15 p.m., a noise that sounded like a detonation was heard. One of the first individuals to reach the laboratory reported that the student was standing in front of the laboratory hood and was engulfed in bright orange flames. Her clothes were also on fire. She died the following day from burns that covered over 60% of her body.

The exact cause of the accident may never be known since the student was alone in the laboratory. It is known, however, that the distillation system was used to prepare batches of moisture-free THF.





LVI-TF in the flask was replenished as needed.

It was apparent from the condition of the calcium chloride tubes which were supposed to protect the system, that moisture had penetrated the barriers.

LVI is known to react violently with water and peroxides. It is speculated that enough water and peroxide (break-down of TLF) was present in the flask to produce an exothermic reaction hot enough to detonate the hydrogen gas released from the break down of LVI when the LVI-TF suspension was disturbed.

After a conference with school officials and DPH and DLS staff it was decided to survey all laboratories in that institution.

#### MEDICAL AND NURSING ACTIVITIES

#### HOSPITALS REQUEST INFORMATION ON PROVIDING OCCUPATIONAL

#### HEALTH PROGRAMS

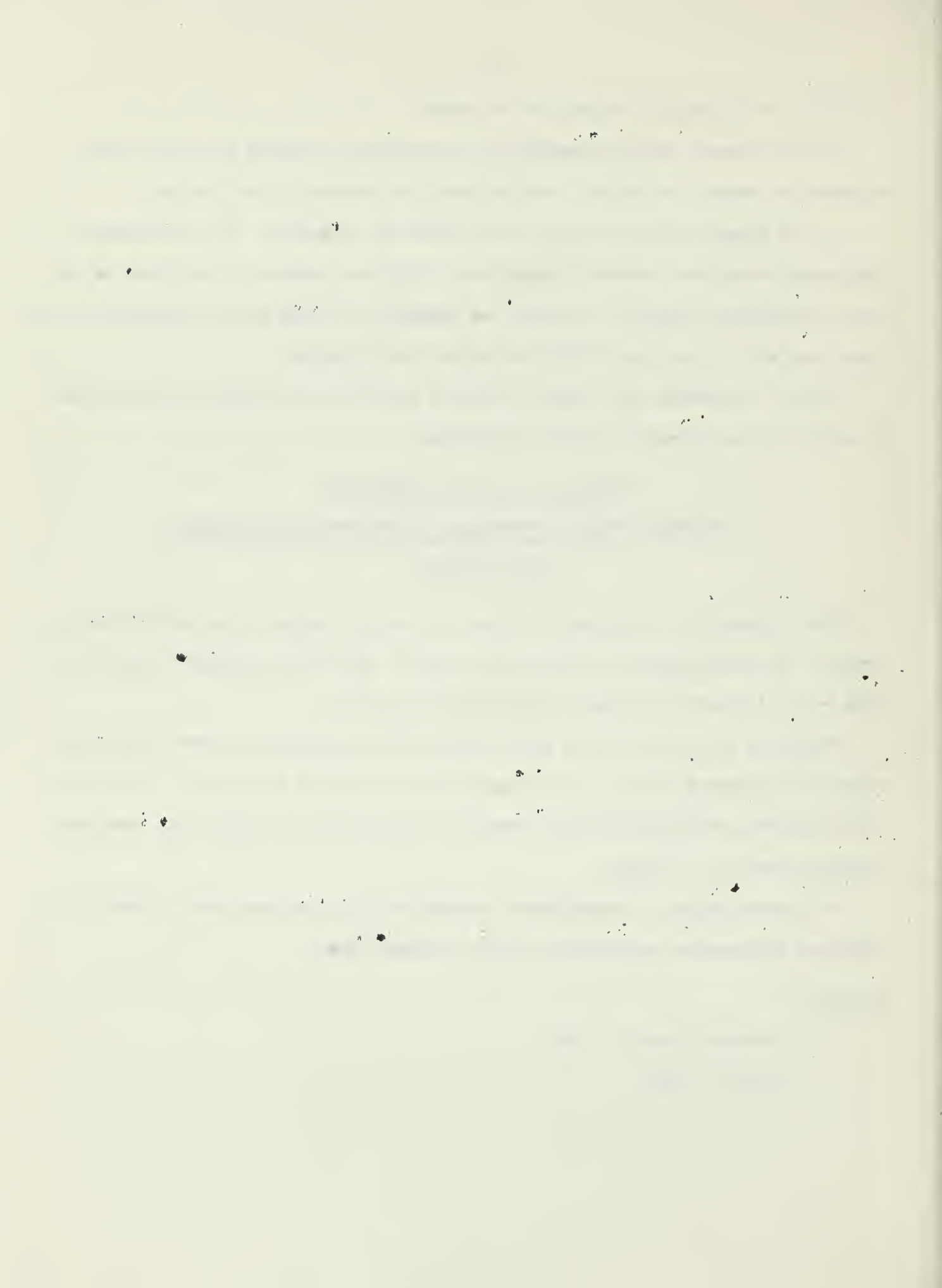
The Division of Occupational Hygiene has received requests for information concerning the establishment of Occupational Health Services in community hospitals. This is a relatively new trend in occupational medicine.

There has been a need for a health care service designed to serve those industries and businesses which do not employ their own doctors and nurses. An occupational health surveillance program based in a hospital or a mobile unit provides a valuable service to industry.

An investigation of established programs of this type was made. A variety of different information was obtained and is outlined below.

#### Finances:

1. Obtained through a grant
2. Hospital funds



3. Included in the budget of an already established clinic (such as Out Patient)

Clients:

1. Are obtained by selling the program by mail, telephone, and personal sales.
2. One health service found that nurses make very effective sales persons and employed them in that capacity.
3. Evaluation of the health needs of a particular industry by the occupational physician, led to enrollment of that company.

Services Offered:

1. Physical Examinations - a variety of physical exams are offered. The company chooses, with professional assistance, which is most suitable to their industry.

- . Basic physical exam
- . Executive physical exam
- . Truck drivers physical
- . Employee physical - tailored to the requirements of the
- . company pre-employment physical

The basic exam includes; Personal and Family medical history. Tine test for tuberculosis, urinalysis and vision testing.

Optional tests included at the request of the company are:

Laboratory blood tests, chest X-rays, Electrocardiogram, Pulmonary Function Study, Audiogram, Treadmill testing.

II Group Screenings

IIII OSHA compliance assistance

IV Disability and back to work evaluations

V Preventive medicine and health counseling

VI Vaccination and immunization procedures

VII Industrial Nursing Program - Visits to local industries on a regular basis for the purpose of:



- . Yearly screening programs
- . Monitoring employee health problems
- . Health education
- . Consulting with employees on health problems
- . Maintaining health files
- . Working closely with Personnel Department and Occupational Health Unit physician

There are some differences in the types of services offered, such as:

- |  |  |
|--|--|
| 1. Diagnostic service only   | 1. Diagnostic and rehabilitative service                   |
| 2. Examinations performed only on individuals sponsored by an industry | 2. Examinations performed on any individual requesting it. |
| 3. _____   | 3. Emergency ambulance service.                            |

Those interviewed agreed, that the essential ingredient in establishing an Occupational Health Service is a medical director experienced and vitally interested in industrial medicine.

#### DOH NURSE CERTIFIED IN AUDIOMETRICS

The Supervising Occupational Hygiene Nurse attended the Industrial Hearing Testing Workshop at Emerson College on September 6th, 7th, and 8th.

The Workshop course covered:

- a) Hearing conservation in Industry.
- b) Physics of sound
- c) Noise measurement
- d) Calibration of audiometer
- e) Audiogram interpretation
- f) Hearing protective devices and fitting.
- g) Lab practice on audiometers

After the successful completion of written, oral and practical performance examinations, certification in audiometric measurement was obtained by the nurse.

#### JOINT CONFERENCE ON OCCUPATIONAL HEALTH

The conference of American Academy of Occupational Health and the American Academy of Industrial Hygiene held in Williamsburg, Virginia, this year stressed records of health and exposure in the workplace and







epidemiology of occupational diseases. The seminar attended by our Senior Engineer was on epidemiology, and was presented by Drs. Philip Esterline and Carol Redmond of the University of Pittsburgh. Epidemiology is the application of mathematical statistics to the data on occupational diseases, and the significant problem is that the epidemiologists and the statisticians do not communicate very well. One therefore gets frequently the use of statistical principles where they do not apply.

The papers presented at the meeting were of two classifications: comments on health exposure data, and epidemiology studies. The quality of the papers varied greatly. Those papers on data tended to be overviews with little new features. Basically, everyone said that data is needed but one should not gather data which will be of no value. Business called for confidentiality of the data. It is certainly apparent that when one starts a data gathering program, substantial thought should be given at the onset as to what one intends to do with the data.

The specific epidemiology studies were of more interest in that they presented a coherent program. One could argue with specifics of the program, and arrive at some conclusion about the value of the study. For example, a study by S. Lamm of Tabershaw's Associates took the results of a previous study showing excess of cancer among some talc workers. Now with a new study of the workers at four plants going into their past associations with mineral dusts, Lamm showed there was no good correlation to the talc exposure.

By far, the best paper was given by H. Daniel Roth, Statistical Consultant, Potomac, Maryland. His paper was devoted to various



statistical models and their misinterpretations. The man demonstrated that he had a good command of his subject and that properly used, epidemiology is a valuable field.

### CONFERENCE ON TOPICS IN OCCUPATIONAL MEDICINE

The Occupational Health Nurse Consultant attended a conference on "Topics in Occupational Medicine". The program was sponsored by the New England Occupational Medical Association and the Mass. Occupational Health Nurses Association.

Two major areas of interest were covered.

1. Women in the workplace.
2. Workmen's Compensation.

Women in blue collar jobs meet many obstacles one doesn't normally think about, such as tools that do not fit their hands, clothing that offers no protection because of its size, levers they can't reach. Since women are taking advantage of changing social attitudes and supportive government actions to tackle physically demanding jobs these barriers will have to be considered and rectified.

### CONFERENCE ON OCCUPATIONAL HEALTH NURSES

The Occupational Hygiene nurse consultant attended the two day conference of Occupational Health Nurses.

The following topics were covered in the program:

#### Day One

- I Occupational Lung Disease
- II Survey of Health Hazards in the work place
- III Occupational Neurology
- IV Evaluation of toxicity of substances.

#### Day Two

- I Occupational Dermatology
- II Epidemiology



The nurse was particularly interested in the pulmonary function screening tests. The nurse plans to learn how to administer the tests and to interpret the results at the Harvard School of Public Health.

#### MEDICAL EMERGENCIES

The Occupational Hygiene Nurse Consultant attended a three day symposium, sponsored by the 804th Army Hospital, Hanscom AFB. The program was on Emergency Medical Care.

The areas of specific interest for the nurse were:

- . Cardio pulmonary emergencies and their resuscitation
- . Emergency treatment of Burns
- . Drug Abuse

#### ENVIRONMENTAL CARCINOGENESIS SEMINAR

The Director and four members of the staff attended a meeting entitled Cancer and the Environment in Massachusetts. Current Problems-Future Actions sponsored by the Massachusetts Public Health Association. Topics covered aspects of both occupational and environmental exposure to carcinogens. The following short talks were given: Carcinogens in Massachusetts Industry; Exposure to Carcinogens in Hospitals and Academic Laboratories; the Status of Current Regulations Governing Exposure to Carcinogens; Asbestos; and P.C.B Exposures to the Public. Comments from both industry and union representatives were also voiced.

#### SEMINAR ON SCREENING IN THE WORKPLACE

The Occupational Health Nurse Consultant attended a symposium, held at the University of Massachusetts Medical School, Worcester. The topic was "Screening in the Workplace."

Screening is the application of tests and procedures, aimed at identifying "predisease" and unrecognized disease.





The costs and effectiveness of screening which make a program practical were discussed.

A disease favorable for screening has the following characteristics:

1. It has relatively serious consequences.
2. It has a high prevalence in its detectable preclinical state; that is, the period between the time the disease is detectable by the screening test and the time when the symptoms become readily apparent so that the patient would have sought out his or her physician anyway.
3. The prognosis is improved as a result of early detection.
4. There is a good screening test available.

Hypertension is a screenable disease. It has all of the above characteristics.

The characteristics of a good screening test are:

1. Relatively high sensitivity; that is, among those who have the disease, the test will pick up a high percentage.
2. Relatively high specificity; that is, of those who do not have the disease, a high percentage will be eliminated.
3. Low in cost, inconvenience and discomfort.

The test for hypertension meets the criteria listed for good screening tests.





SOURCES OF INQUIRY

<u>Source</u>	<u>Services</u>	Information	<u>Total</u>
Division of Industrial Safety	70	9	79
Follow-up	14	--	14
Radiation Surveys	197	--	197
Self-Initiated	70	--	70
Employer	104	211	315
Labor Union - Employees	138	22	160
Government	92	72	164
Physicians-Hospitals	31	18	49
Dentists	10	1	11
Nurse	2	4	6
Consultants-Contractor	12	34	46
Research	1	4	5
Schools	54	58	112
Professional Organization	5	7	12
Non-Prof. Organization	3	20	23
Insurance	4	9	13
Non-Official Agency	3	5	8
Attorneys	1	11	12
OSHA	0	5	5
Publisher	2	14	16
Public Utility	1	3	4
Libraries	2	5	7
Tenants, Citizens, etc.	12	60	72
	<u>828</u>	<u>572</u>	<u>1400</u>
Out of State Requests		51	51



FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONSSUMMARY BREAKDOWN

<u>Classification</u>	<u>Different Types</u>	<u>Investigations</u>
A. <u>Chemicals</u>		(325)
Solvents	47	171
Metals	11	71
Gases	18	73
Other		
Acids	3	3
Fumes, Mists, Smoke	6	7
B. <u>Dusts</u>	26	(348)
C. <u>Physical Hazards</u>		(246)
Noise		28
<u>Radiation</u>		
Radioactivity		90
X-radiation		43
Microwaves		7
Lasers		2
Ventilation		76
D. Infections and Diseases, N.O.C.		(5)
Chronic Obstructive Disease		3
Dermatitis		2
Total Investigations		<hr/> 924



FREQUENCY OF POTENTIAL HAZARDS INVESTIGATIONS  
HARMFUL SUBSTANCES AND CONDITIONS

Acetone	1	Cobalt	1
Aldehydes, N.O.C.	1	Combustible Gases, N.O.C.	1
Ammonia	2	Cyclohexanone	2
Asbestos	315		
		Dermatitis	2
Benzene	3	O-Dichlorobenzene	2
Beryllium	1	1,2,-Dichloroethane	1
Boric Acid	1	Dimethylformamide	1
Butyl Acetate	2	Dust, N.O.C.	19
Butyl Carbitol	1		
Butyl Cellosolve	1	Epichlorohydrin	1
Butyrolactone	1	2-Ethoxyethanol	1
		Ethyl acetate	4
Cadmium	1	Ethyl alcohol	4
Carbitol	3	Ethyl Cellosolve	1
Carbon Dioxide	3		
Carbon Monoxide	32	Fibrous Glass	1
Carbon Tetrachloride	3	Fluorides	2
Cellosolve	1	Formaldehyde	3
Cellosolve Acetate,	2	Freons	4
Chlordane	1		
Chlorine	3	Hexane	7
Chromium	3	Hydrochloric Acid	1
Chronic Obstructive Disease	3	Hydrogen Fluoride	1
Coal Tar Volatiles	1	Hydrogen Sulfide	3





Iron Oxide	4	Odors, N.O.C.	2
Isobutyl Acetate	2	Organic Vapors, N.O.C.	2
Isopropyl Acetate	2	Oxygen	2
Isopropyl Alcohol	8		
		Paper Dust	1
Laser	2	Perchloroethylene	11
Lead	32	Perfluoroisobutylene	1
Lead Chromate	2	Phosgene	1
		Phosphoric Acid	1
Mercury	22	Propyl Acetate	1
Methane	2	n-Propyl Alcohol	1
Methyl Alcohol	2	Pyridine	3
Methyl Butyl Ketone	1	Pyrolysis Products	1
Methyl Chloroform	7		
Methylene Chloride	5	Radioactivity	90
Methylene Bisphenyl Isocyanate	1	Silica	4
Methyl Ethyl Ketone	8	Silver	2
Methyl Isobutyl Ketone	3	Smoke	2
Microwaves	7	Stoddard Solvent	2
Mineral Spirits	3	Sulfur Dioxide	1
		Styrene	5
Naphtha	10		
Naphthol	1	Tin	1
Nickel	2	Toluene	19
Nitrogen Dioxide	4	Toluene Diisocyanate	9
Nitrous Oxide	3	Trichloroethane	3
Noise	28	Trichloroethylene	6
		Tridecyl Alcohol	1



Ventilation	76
Vinyl Chloride	1
Welding Fumes	1
Wood Dust	1
X-radiation	43
Xylene	16
Zinc	6

#### CLASSIFIED BY ACTIVITIES

Medical Consultations	28
Nursing Consultations	57
Meetings	201
Talks	39

#### INFORMATION REQUESTS

Safe Practice Bulletins (Complete Sets)	206
Safe Practice Bulletins (Singles)	700
Annual Reports	65
Industrial Bulletins	22
Special Bulletins	20



FIELD WORK

	<u>PLANT VISITS</u>	<u>OTHER VISITS</u>	<u>TOTAL</u>	<u>TALKS</u>
Director	2	48	50	7
Assistant Director	8	20	28	5
Engineers	1061	110	1171	12
Chemists	206	62	268	4
Physician	13	27	40	5
Nurse	97	32	129	6
	<u>1387</u>	<u>299</u>	<u>1686</u>	<u>39</u>

RECOMMENDATIONS

<u>TYPE</u>	<u>NUMBER</u>	<u>WORKERS AFFECTED</u>
Environmental	1398	11,282
Health Services	<u>417</u>	<u>65,853</u>
Total	1815	77,135



ENVIRONMENTAL TESTS

<u>Substance or Condition</u>	<u>Number</u>	<u>In Harmful Exposure Range</u>
<u>PHYSICAL HAZARDS</u>		
<u>Radiation</u>		
Radioactivity	2994	66
X-Radiation	1280	35
Microwaves	368	6
Noise	706	178
Ventilation	982	214
<u>CHEMICAL HAZARDS</u>		
Ammonia	7	3
Carbon Dioxide	18	10
Carbon Monoxide	564	150
Chlorine	4	0
Combustible Vapors, N.O.C.	5	0
Formaldehyde	13	0
Hydrogen Sulfide	23	1
Isopropyl Alcohol	1	0
Methane	37	11
Methylene Bisphenyl Diisocyanate	4	0
Mercury	599	59
Nitrogen Dioxide	13	2
Nitrous Oxide	1	0
Organic Vapors, N.O.C.	7	0
Oxygen	22	10
Perchloroethylene	15	0





56.

Phosgene	6	0
Sulfur Dioxide	7	5
Styrene	3	0
Toluene	4	0
Toluene Diisocyanate	30	30
Trichloroethylene	4	0
Xylene	9	0
Total	<u>7726</u>	<u>780</u>



AIR SAMPLES COLLECTED1. PARTICULATES

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Asbestos	660	19
Boric Acid	2	0
Calcium Carbonate	2	0
Cotton	4	0
Dust, N.O.C.	47	5
Iron Oxide	21	9
Silica	7	2
Smoke	<u>2</u>	<u>0</u>
Total	745	35



AIR SAMPLES COLLECTED2. CHEMICALS

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Acetone	11	0
Acetophenone	2	0
Ammonia	4	1
Antimony	1	0
Benzene	12	0
Beryllium	3	0
1,4-Butanediol	1	0
Butyl Acetate	14	0
Butyl Carbitol	3	0
Cadmium	3	0
Carbitol	8	0
Cellosolve Acetate	9	1
Chromic Acid	2	0
Chromium	7	0
Coal Tar	3	0
Cobalt	7	0
Copper	3	0
Cyclohexanone	11	0
O-Dichlorobenzene	2	0
Dimethylformamide	8	0





AIR SAMPLES COLLECTED2. CHEMICALS

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Epichlorohydrin	2	0
Ethyl Acetate	22	0
Ethyl Alcohol	9	0
Ethyl Cellosolve	3	2
Formaldehyde	31	2
Freons	12	0
Heptane	2	0
Hexane	37	0
Hydrochloric Acid	2	0
Hydrogen Fluoride	2	0
Hydrogen Sulfide	5	0
Isobutyl Acetate	9	0
Isobutyl Alcohol	3	0
Isopropyl Acetate	9	0
Isopropyl Alcohol	36	0
Lacquer Thinner, N.O.C.	15	2
Lead	133	32
Lead Chromate	6	1
Methane	2	2
Methyl Butyl Ketone	2	0



AIR SAMPLES COLLECTED2. CHEMICALS (cont.)

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Methyl Chloroform	5	0
Methyl Ethyl Ketone	36	1
Methylene Bisphenyl Isocyanate	6	0
Methylene Chloride	11	0
Methylene Dianiline	4	0
Methyl Isobutyl Ketone	8	0
Mineral Spirits	11	0
Naphtha	45	3
Nickel	11	0
Nitrogen Dioxide	1	0
Organic Solvents, N.O.C.	9	0
Paradichlorobenzene	6	0
Perchloroethylene	10	0
Phenol	2	0
Propyl Acetate	5	0
Propyl Alcohol	5	0
Pyridine	4	0
Pyrolysis Products, N.O.C.	4	1
Selenium	3	0
Silver	6	0
Stoddard Solvent	5	0
Styrene	14	0



## AIR SAMPLES COLLECTED

2. CHEMICALS (cont.)

<u>Substance</u>	<u>Number</u>	<u>In Harmful Range</u>
Tetrahydrofuran	3	0
Tin	11	0
Toluene	69	4
Toluene Diisocyanate	31	22
Trichloroethane	1	0
Trichloroethylene	16	0
Trimethylol Propane	1	0
Vinyl Chloride	2	0
Xylene	47	0
Zinc	30	1
Total	<u>887</u>	<u>75</u>



LABORATORY WORK

<u>AIR SAMPLES</u>		2067
Chemical	887	
Dusta	1180	
<u>Material Samples</u>		507
Chemical	23	
Microscopic	441	
Infrared	106	
<u>SMEAR SAMPLES</u>		15
Chemical	5	
Dust	10	
<u>Urine Samples</u>		1294
Cadmium	19	
Hippuric Acid	89	
Lead	377	
Mercury	771	
Phenol	2	
Trichloroacetic Acid	36	
<u>Blood Tests</u>		1924
Lead	1924	
<u>Breath Tests</u>		
Carbon Monoxide	10	10
<u>Proficiency Analytical Testing Program</u>		
Asbestos	24	
Cadmium	24	
Lead	24	
Solvents	24	
Zinc	24	
West Allis Memorial Hospital Blood Testing Programs		12
CDC - 3 blood tests		3





PUBLICATIONS

1. Recommended Safe Practices, Ventilation Data Sheet No. 13, Disc Grinder." Bulletin, September 1978, 1 p.
2. Recommended Safe Practices, Ventilation Data Sheet No. 7, Blasting Rooms." Bulletin, July 1978, 1 p.
3. Recommended Safe Practices, Mineral Data Sheet No. 1, "Silica." Bulletin, July 1978, 2 pp.
4. Recommended Safe Practices, Respiratory Protection Data Sheet, No. 2, "Acid Gas Masks." Bulletin, July 1978, 1 p.
5. Recommended Safe Practices, Medical Data Sheet No. 9, "Cutting Oil Dermatitis." Bulletin, September 1978, 2 pp.
6. Miscellaneous Bulletins, August 1978, 2 pp.
7. Recommended Safe Practices, "First Aid Monthly Summary." Nursing Data Sheet No. 15, August 1978, 1 p.
8. Reprints of Writings of the Staff. August 1978, 3 pp.
9. Recommended Safe Practices, Mineral Data Sheet No. 7, "Silicon Carbide." Bulletin, September 1978, 1 p.
10. Recommended Safe Practices, Mineral Data Sheet No. 8, "Aluminum Oxide." Bulletin, September 1978, 1 p.
11. Recommended Safe Practices, "Respiratory Protection Data Sheet No. 24, "Dispersoid Respirators Highly Toxic Dusts." Bulletin, September 1978, 1 p.
12. Recommended Safe Practices, "Mineral Data Sheet No. 6, "Granite." Bulletin, January 1979, 1 p.
13. "Guidelines for Office Buildings with Asbestos Fireproofing." Bulletin, September 1978, 2 pp.
14. Recommended Safe Practices, Chemical Data Sheet No. 1, "Formaldehyde." Bulletin, October 1978, 1 p.
15. Recommended Safe Practices, Chemical Data Sheet No. 2, "Carbon Tetrachloride." Bulletin, October 1978, 1 p.
16. Recommended Safe Practices, Chemical Data Sheet No. 26, "Toluene." Bulletin, October 1978, 1 p.
17. Recommended Safe Practices, Chemical Data Sheet No. 4, "Carbon Disulfide." Bulletin, October 1978, 1 p.



PUBLICATIONS

18. Recommended Safe Practices, Chemical Data Sheet No. 23, "Sulfur Dioxide." Bulletin, October 1978, 1 p.
19. Recommended Safe Practices, Ventilation Data Sheet No. 22, "Spray Painting Rooms." Bulletin, November 1978.
20. Recommended Safe Practices, Mineral Data Sheet No. 4, "Pumice." Bulletin, November 1978, 1 p.
21. Recommended Safe Practices, Chemical Data Sheet No. 6, "Carbon Monoxide." Bulletin, October 1978, 2 pp.
22. Recommended Safe Practices, Nursing Data Sheet No. 7, "First Aid Log." Bulletin, November 1978, 1 p.
23. Recommended Safe Practices, Chemical Data Sheet No. 20, "Oxides of Nitrogen." Bulletin, November 1978, 1 p.
24. "Oat Cell Lung Cancer in Selected Occupations." A case-control study. Journal of Occupational Medicine, December 1978, 4 pp.
25. Recommended Safe Practices, Medical Data Sheet No. 10, "Personal Hygiene in Handling Epoxy Resins." Bulletin, January 1979, 1 p.
26. Recommended Safe Practices, Nursing Data Sheet No. 13, "Services Available for Health and Educational Materials." February 1979, 2 pp.
27. Recommended Safe Practices, "Nursing Data Sheet No. 11, "Color Coding." Bulletin, February 1979, 1 p.
28. "Benzene exposure in the rubber coating industry - a follow-up." American Industrial Hygiene Association Journal, February 1979, 10 pp.
29. Recommended Safe Practices, Respiratory Protection Data Sheet No. 31, "Respirators Care and Maintenance Program." Bulletin, June 1979, 2 pp.
30. Recommended Safe Practices, Chemical Data Sheet No. 8, "Ammonia." Bulletin, May 1979, 2 pp.
31. Recommended Safe Practices, Chemical Data Sheet No. 32, "Parathion." Bulletin, June 1979, 2 pp.
32. Recommended Safe Practices, Chemical Data Sheet No. 25, "Organic Acetates." Bulletin, April 1979, 1 p.
33. Recommended Safe Practices, Nursing Data Sheet No. 6, "Recommended First Aid Supplies." Bulletin, June 1979, 2 pp.



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34. "List of significant changes in Industrial Bulletin No. 5,"  
Bulletin, April 1979, 2 pp.
35. Recommended Safe Practices, Nursing Data Sheet No. 2, "Information Concerning Pregnant Employees." Bulletin, June 1979, 2 pp.
36. "Role of the Occupational Health Nurse." Bulletin, May 1979.
37. "Role of the Occupational Health Physician." Bulletin, May 1979.
38. Recommended Safe Practices, Ventilation Data Sheet No. 21,  
"Laboratory Hood." Bulletin, May 1979.
39. "Economic Value of Health Service Department." Bulletin,  
June 1979, 3 pp.











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